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[OFFICIAL NOTICE.]

The American Gas Institute Response Vote.

HEADQUARTERS, AMERICAN GAS INSTITUTE,
25-29 WEST 39TH STREET,
NEW YORK, August 10, 1908.

To the Members of the American Gas Institute: The Committee of Arrangements, for the meeting to be held in New York next October, is very much gratified by the response to the Committee's request for information. The replies so far received indicate a very large attendance; but there are still 700 members who have failed to fill out and return the postal card sent to them. It will materially assist the Committee of Arrangements if these 700 members will be good enough to fill out the postal card and mail at once.

COMMITTEE OF ARRANGEMENTS, by
W. R. ADDICKS, Chairman.

BRIEFLY TOLD.

THE FIRST FINDINGS OF THE RAILROAD COMMISSION OF WISCONSIN AS AFFECTING THE LIGHTING INTERESTS.—Prior to the enacting of the public utilities law of Wisconsin, under which the Railroad Commission was authorized to in fairly good measure regulate the conducting of business by the franchise holding lighting companies of the State, there were sustained suggestions that such legislation meant at least a narrowing of the liberty or freedom under which such corporations had been working. The Wisconsin measure was adopted in 1907, and up to now constitutes sufficient space or period in which to consider whether or not the forebodings were to be realized and in what degrees. This is especially so in view of the fact that the first recommendations from the Commission have to do with matters that are vital issues surely between the lighting companies and their customers. The first week of August rules were issued governing the purity of gas, the pressure limits within which it might be supplied, plans and standards for the testing of meters and some minor things. The rules or regulations number altogether 25, of which 13 relate to gas supply, the balance going to the directing of electric current supply and kindred matters. We will venture the thought here that at least 9 of the 13 would be prescribed by the interests themselves, and this is especially true of the regulations regarding meter testing—no one certainly may cavil over a rule which allows 2 per cent. either way as to accuracy of registration, or that a company shall keep records of tests, or as to the mode and manner of making the tests. These all appear eminently fair. Rule No. 2, however, is perhaps somewhat over exacting. It directs that no company shall "Allow a meter to remain in service for a period longer than 3 years without checking it for accuracy. * * *." It is our province to say that, thanks to the care, skill and honesty—yes, that's the proper word—of gas meter makers that the instruments put forth as finished from their shops will certainly average 5 years' constant service, without any marked deterioration, provided, of course, that the meters have not been put in places where they should not have been put, and that they have been treated with the care that should be accorded them—nor is there any reason whatever to ask that that care shall be of the finical sort. Certainly, many meters would require looking over even oftener than once in 3 years, but not all of them; *not* by a decided percentage. A period of 4 years would not have been too great; in fact, five would not be stretching it any too far. However, such determinations are easily altered from and by the showings of experience. Only in one instance, as to a chapter of the rules, does harshness seem to have crept in and this chapter holds the sections relating to pressure regulations. For instance, Rule X. reads: "Gas pressure, as measured at meter inlets, shall never be less than 1½ inches nor more than 6 inches of water pressure, and the daily variation of pressure at the inlet of any one meter on the system shall never be greater than 100 per cent. of the minimum pressure." No commission or other public legislative body has been able to comprehend the real effect, worth and value of pressure and its control. There is no need of the State seeking to prevent bursting pressures on meters—the meter makers and the gas suppliers will take care of that from completely unaltruistic grounds. And from the outlet of the meter the consumer is in direct control by means of the burner key. The entire range of pressures is altogether dominated by the exercise of the slightest bit of watchfulness. We shall print the rules complete next week, and the subject may now be laid aside with the remark that if its other work is to be as fair as is its first, the lighting utilities of Wisconsin—rather, the controllers thereof—need not fear they are to have fair play.

CURRENT MENTION.—

MR. J. P. INGLE, who has been in the service of the Columbus (Ga.) Gas Light Company for several years, acting in the position of Assistant Superintendent thereto, has been appointed Superintendent of the Baton Rouge (La.) Gas Company.

THE authorities of Salt Lake City, Utah, some time ago ordered many changes to be made in the grades of certain streets in that city,

AUG 24 1
SMITHSONIAN DEPOSIT

quite a number of which were of a nature to cause radical changes in the main and service pipe systems of the Utah Gas and Coke Company. The relocating and relaying of such pipes involved a considerable expenditure, in consequence of which the Company asked the Board of Public Works to reimburse it, notably in instances where the pipe had been put down according to lines prepared by the City Engineer. The Board referred the matter to the City Attorney (Mr. J. T. Dominny) for opinion as to the city's liability in the premises. His reply certainly must have pleased the authorities, for the opinion could be thus summed up: If the lowering or changing of the mains was made necessary by any kind of work which was being done on behalf of the public it was the bounden duty of any corporation, occupying the surface of or depth under the public thoroughfares, to bear the expense of removing or relaying its pipes, ducts, etc. Nor did it make the slightest difference whether such pipes, ducts, etc., had been originally laid according to locations and levels furnished from or by any city engineer.

THE City Council of Tacoma, Wash., recently entertained the notion, evidently being led thereto by the howls of certain "citizens," some of whom are not notably prompt in settling their accounts with the Gas Company, that the latter was not in any fair sense keeping up to its contract in the instance of the quality of gas supplied. A hearing was ordered, during the course of which the General Manager of the Company, Mr. W. A. Aldrich, presented some facts that caused a "reasonable" proportion of the audience to leave the Council chamber not quite so sure of their ground as when they entered it. Mr. Aldrich, amongst other things, said that 2 years or so ago there might have been some color for some of the accusing items urged, but that any complaint now was on neither just nor equitable grounds. He showed that during the past 2 years every dollar that the Company earned, and $176,000 additional, had been invested in betterments and extensions, that it had increased its business 64 per cent., and had virtually rebuilt the plant. In 1905 the candle power of the gas supplied averaged less than 16 candles, whereas now the average was 18, and the plant was to all intent a model one. Continuing, he said the leakage loss was not less than 14 per cent., which figure was being continuously lowered, as the defects in the original distributing system were being corrected- the main system now covered 71 miles, an increase of 19 miles in 2 years. The Company was assessed on a valuation of $546,000, which included a charge of $225,000 on franchise account, the named sum being out of all reason when real values were taken into consideration. Again, the Company had to contend with a municipally operated electric lighting plant, and its operation, from a competitive point of view, was replete with instances of unscrupulousness. Last year the Company's payments on taxation account amounted to 21 cents on every 1,000 cubic feet of gas paid for. Further, that the average bill per consumer (there were 5,400 of these) did not exceed $1.25 He concluded his arraignment-defense by inviting the Fire and Water Committee of the Board to make a personal inspection of the plant, the Committee to then, through a competent person, test for candle power, purity, etc. Strange to say, the Committee agreed to make the visit, and a day for the inspection was to have been named at our last advices. It might be further said that the charges made against the Company terminated in a demand that, because of the alleged delinquencies, its charter should be declared forfeited. The ending of the story seems well worth waiting for.

THE plant of the Baltimore Retort and Firebrick Company, at Hull and Nicholson streets, Baltimore, was badly damaged by fire the morning of the 17th inst., the mixing, setting and finishing divisions of the plant having virtually been destroyed. The loss is put at $70,000, fully 50 per cent. of the loss being covered by insurance. The loss of the contents of its draughting room is the severest of all. Vice-President Louis M. Rancke seems to have been up and doing, though, for he had new office quarters opened up by 10 A.M. of the 19th, and construction work on temporary manufacturing quarters was underway. Fortunately the kilns were unimpaired, and the large stock of finished goods on hand suffered no damage whatever. The only real delay in filling orders will be in connection with special shapes; a delay that in no instance can amount to anything serious. Regretting the disaster that has overtaken them, we cannot forbear from complimenting the proprietors on the pluck and activity with which they went on with the work of restoration.

THE Marquette County (Mich.) Gas Company, in order to stimulate the placing now of gas ranges, etc., before the cold season arrives, offers in its Marquette and Negaunee branches, to put in the necessary apparatus, such as gas cookers, radiators or other forms of heaters, etc., if set in prior to September 15th, making no charge for the gas used in the appliances during the first month.

JUDGE GREENLEE of the Superior Court, State of Indiana, on the 17th inst., appointed the Elwood Trust Company, of Elwood, as receiver for the estate of the Elwood Heat and Light Company, and directed him to sell all of its estate on the 18th prox. The correspondent who informed us of that action inclosed the following further details: "The Elwood Heat and Light Company is composed of those known as Eastern capitalists, none of the stock being owned locally. The original bond issue of the concern amounts to $342,000, upon which interest has been allowed to accumulate until the indebtedness amounted to $361,285, in addition to attorneys' fees, money advanced, etc. For these latter items judgment has also been allowed. The property consists of all the gas plant and franchise rights in Elwood, including wells, lines, pumping station, gasholder, street mains, office fixtures, etc."

Office Building of the Detroit City Gas Works.

We are indebted to the courtesy of Mr. Charles S. Ritter for the following description of the beautiful and commodious office structure recently constructed by the Detroit City Gas Company. It certainly is creditable to the Company from a business standpoint and from its desire to add to the fair fame of Detroit as well:

The new office building, now occupied by the Detroit City Gas Company, which was completed June 1st, 1908, is conveniently and attractively located at the corner of Washington Boulevard and Clifford street, a short half block from the main thoroughfare of the city (Woodward avenue) and within 400 feet of four street car lines. A favorable angle in Clifford street, and the striking appearance of the "white building" make it easily seen, and very attractive, from Woodward avenue. Far enough away from street car lines and main travelled streets to minimize the noise, and fronting on a park, it evolves a very agreeable sense of comparative quiet and isolation. The greatest breadth with front of the building is exposed to the north; blinds and awnings being unnecessary on this side, the maximum natural light is allowed to enter the building all day long. Direct sunshine is minimized to such an extent that it is comparatively cool in summer. This, together with an electrically operated ventilating system, makes the offices very comfortable to work in.

Directly opposite, on one corner of the street, is the telephone building, and on another is the Y. M. C. A., a convenient place for the women employees of the Company to lunch at noon, or pass the hour in reading or other recreation. In front is Washington Boulevard, a beautiful street over 200 feet wide, with flowers, shade trees and shrubbery.

The building was designed by Messrs John Scott & Co., local architects, and embodies an arrangement the details of which were worked out by officers and heads of departments of the Gas Company. It is constructed of white terra-cotta, cement, steel, tile and concrete. The floors are of expanded metal, tile and concrete, and the building is fireproof throughout.

It is an 8-story structure. The first floor, or main office, is finished in mahogany and marble, with marble floors and counters, bronze cages for the tellers and bronze gas fixtures. The second floor, and all above, are finished in marble and quarter-sawed oak. The gas fixtures, which are of special design, have pilot tube arms for inverted burners, and are lighted in clusters by turning the main cock at the fixture.

On the first floor, in front of the counter, is a lobby 85 feet long and 23 feet wide, a portion of which is used in displaying gas appliances. This floor contains the order department, collection department, tellers, cashier, complaint department, and the office of the Secretary and Assistant Treasurer. The collection, order and complaint departments are separated by tellers' cages in such a manner that conversations in one cannot be overheard in another. A consumer leaving an order cannot hear one making a complaint. The Secretary's and Cashier's offices are so located that they overlook all of the other departments and the telephone signal board. All of these departments are in close touch with the other floors by telephone, pneumatic tube system, and an electric book hoist. The telephone service consists of a double switchboard of 10 trunk and 29 sub-lines. On the main floor are located 11 telephones, connected up with a signal board that illuminates the number called, remaining so until call is answered. The board is visible from practically every point on the floor.

The pneumatic tube system comprises 14 stations located in different parts of three floors and basement, with a central station in the basement. The system is capable of handling carrier boxes 9 inches long and 3 inches in diameter, which will hold practically every special form used by the Company. It is connected with the tellers' cages and collection department, so that payments can be made from any one of the offices. Duplicate bills and sundry information from the bookkeeping department, orders and complaints are all transported through these tubes to the various departments, thus bringing them all in close touch with each other.

The electric book hoist is automatic and may be brought to or sent from any one of the three floors by merely pushing a button. When it arrives at its destination an electric signal light illuminates a glass door in the cage.

The second floor carries the Directors' room, General Manager's office, new business room, purchasing department, drafting room, engineers' and other general offices, which are also connected by telephone, book-hoist, tube syste[illegible] and annunciator call bells. The

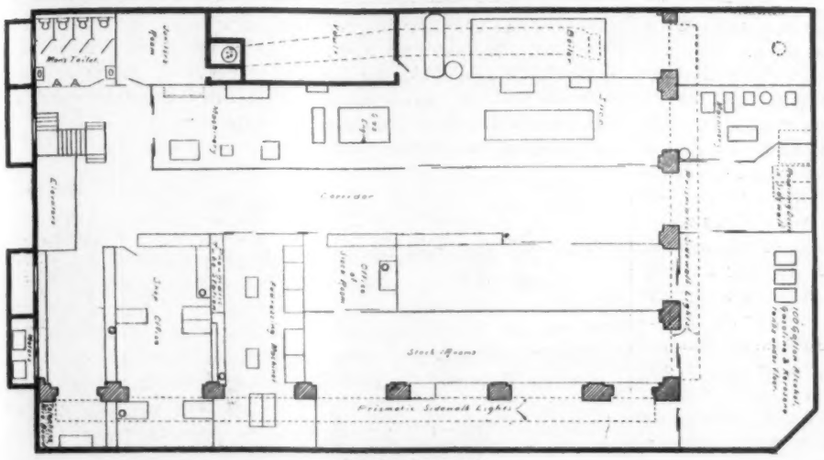


Fig. 1.—Basement.

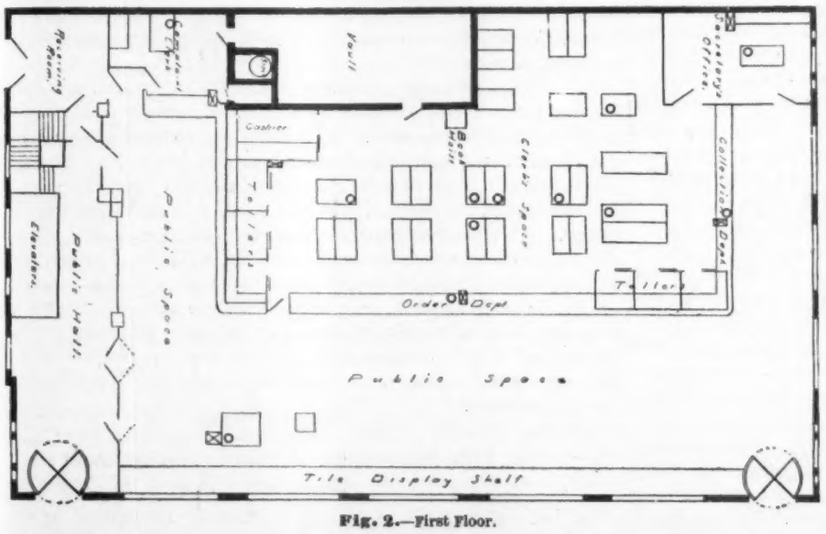


Fig. 2.—First Floor.

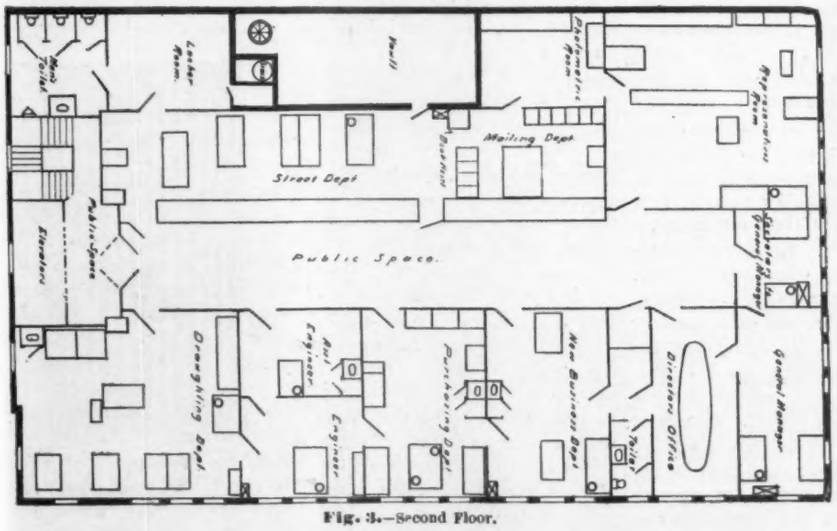


Fig. 3.—Second Floor.

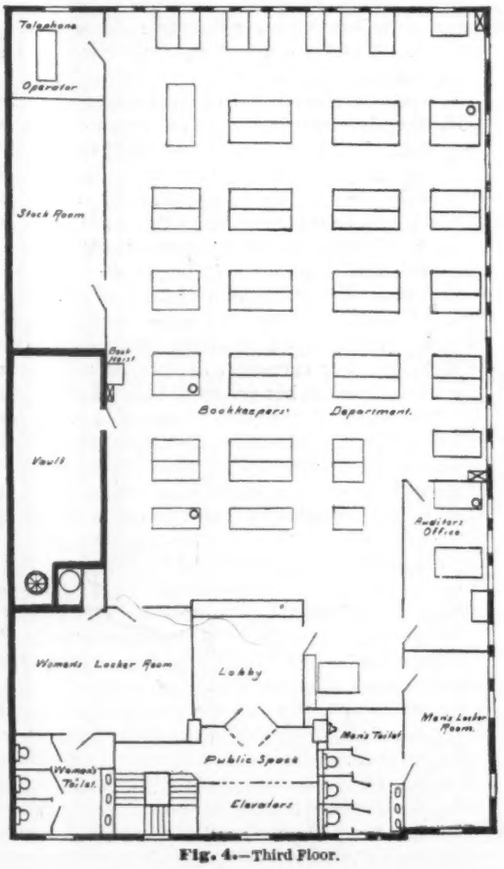


Fig. 4.—Third Floor.

vault on the second floor is connected with the vault on the third floor by a spiral staircase, which answers the combined purposes of ventilating both and making each directly accessible from the other. The offices are so arranged that those nearest each other are the ones most intimately related.

The bookkeeping and auditing departments, the women's and men's toilet rooms, stationery stock room and telephone exchange are located on the third floor. The messenger boys on the third floor receive the requests for information, duplicate bills, stationery, etc., and after execution dispatch them to the various departments by hoist or tubes. Requests for duplicate bills are stamped by a time clock in the department receiving them and stamped again when they are returned, in order to settle any dispute as to the time a customer is obliged to wait, or to locate delays on the part of any of the clerks. In the basement are located the shop department, where meter men, inspectors, meter readers, maintenance men and complaint men report and get orders; the storeroom, where arc lamps, fixtures, gas appliances, mantles, pipe and fittings, extra meters, oil and gasoline for motor cars, and sundry stock are kept; pneumatic tube exchange, and addressing machines and addresses, vault, heating plant, 125-horse power Westinghouse gas engine, direct connected to a 75-kw. generator, which supplies current for the building, including the elevators, and the other incidental machinery, all electrically operated, and the shop where drills, threading machines, etc., are located.

The Gas Company occupies at present the three lower floors and basement, the balance being rented to high-class tenants. The building is piped throughout with gas and wired for electricity, the tenants having the option of using either. Physicians, surgeons and dentists in the building are supplied with compressed air. The elevators are of the latest type, electrically operated.

The arrangement of the different departments, with relation to each other, the construction of the building, its location with reference to accessibility, freedom from confusion, natural light obtainable, and the artistic effect produced by the architects, all combine to make it probably the best building used for gas office purposes in the country.

The accompanying pictures and diagrams will probably give a better idea of the building than a written description, and a visit to the offices themselves would be even more effective.

Beautifying Architectural Designs with Lamps and Lights.

[Prepared for the JOURNAL, by "R."]

One who has travelled through the suburbs of large cities, or in country places where those who dwell in high places are to be found, cannot avoid noticing the marked improvements made in the architectural designs of entrances to estates where lighting is needed. There has been a great effort on the part of wealthy persons possessing country estates to acquire something out of the common for ornamentation of the stile and arbors at the entrances to their grounds. You can find expensive outlays for monumental effects in marble and granite, with steps, arbors and displays of lighting. You will also

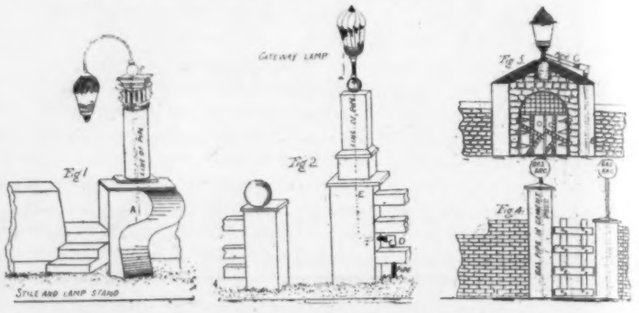
notice the less expensive designs, made up in simple stone structures, topped off with the necessary fixture carrying the lamp. You will also see massive granites made in imitation of ancient Egyptian designs, and while but few of these stones which form the base for the lighting devices were dug out of the sands of Egypt, some of them are exceedingly interesting. The crudely executed figures in imitation of the genuine article always serve to attract observation and please the passerby, or who are visiting the host. Some very stately embellishments may be seen, and again there are architectural designs which are merely attractive stone seats, arranged with stile effect, one side of which looms up for the purpose of carrying the lighting fixtures. One may also discover arbors, usually of stone, through which the people visiting the secluded home must pass, which arbors are lighted with gas arcs, acetylene or other form of lights. Indeed, the business of beautifying entrances to summer residences, country homes and suburban resorts has grown to considerable extent in recent years.

The gas lighting engineer has gotten his share of the business, for he has been called upon to install systems of lighting at entrances of estates of considerable size, necessitating the carrying of underground pipes from quite a distance oftentimes. Having been required to map out explanatory designs, he has been obliged to figure out many estimates of cost of modernizing certain entrances to noted estates. Frequently the plans required for the alterations are of such elaborate nature that it becomes necessary to turn the matter over to an architect. Sometimes the plan involves the taking of a photograph of the entrance as it is and a hand sketching is made of what it is to be, and the mechanics installing the system on the new plan work entirely by the chart thus executed. The construction of the stone pillars and steps falls to the lot of the stone workers of the vicinity, but in placing the piping for the carrying of the gas for the arcs, the gas man is called upon, and his judgment is required in the execution of the work. I know certain gas pipe fitters and engineers who are deriving considerable income by the fad which calls for the changing of the entrances of country and suburban homes over to comply with up-to-date things. In fact one gas engineer goes about photographing "Before and after" entrances, for the purpose of using the photographs in the placing of new contracts, and has all of the business he can attend to. He will show a picture of a comely, little, squatty, entrance to a great home, and he is ever ready to explain to the heirs of the estate what can be done towards remodelling the entrance. He will display photographs of what he has done before. The work not only applies to the great estate, but to the average home where there is room enough out front for a drive and entrance. Even when there is not this space the entrance is often given the overhauling noted and is made to be a pleasing sight. Tumbledown bars and crooked gates give way to the new elaboration. The man who is after the business shows sketches like the adjoining ones. He explains that he can tear out the old wooden gate and the rickety connections and put in a cement and stone stile, with pillar supporting a lamp, as in Fig. 1. Hence the entrance for the foot passengers will be well lighted. While the steps may not be necessary, they nevertheless form part of the scheme and are used, even though the person entering simply goes up the steps to go down again on the other side. Slopes, angles, ornaments, vases and various apparently useless devices are used with novel effect. The line of pipe has to be handled by the gas engineer. He cannot run it up on the outside in view, for the owner of the estate will object. While the stone edifice is in progress of design and erection, the builder usually notifies the gas mechanic so that the latter may plan for the line of piping. If cement posts and walls are used the concrete process of moulding enables the pipes to be cast within the shell in the mould direct.

Although some of the landed proprietors use marble and granite effects, the much cheaper moulded concrete posts and blocks are employed by the average person. The line of the pipe through the cast blocks is shown at *A*. The pipe emerges from the top of the post at *P*, serving as a support for the lamp as well as an agency for conveying the gas. In Fig. 2 we have a form of gateway lamp in which the entire construction of the posts and the rails forming the fencing are of concrete. The concrete manufacturers are enabled to produce the long pieces for the fencing with great accuracy. The pieces are about 8 feet long. The arrangement for carrying the gas for the lamp, which is adjusted on top of the post, is exhibited at *D*, where the pipe enters the base post and passes up through the center on the line *E*, to the top, where connection is made with the lamp.

Some of the owners of country residences prefer to have the closed style of entrance shown in Fig. 3. A wall is erected and substantial posts and heavy swinging doors are fitted in, as shown. The plan of providing the light for this combination consists in introducing the pipe back to the post at *b*, and running it up to the joint at *c*, where connection is made with the lamp. In the event that cast concrete posts are used, the piping can be moulded in the cement composition very readily during the process of manufacture.

Another style of entrance observed by the writer is shown in Fig. 4,



in which there is a lamp furnished for the top of each side post. The line of the gas pipe is through the center of the posts supporting the gas arcs, as shown.

The expense of making over the fronts of country and suburban entrances to homes of a necessity varies. I have seen $1,000 put out without much of a display. With the cement materials available at the present time, moulded blocks, posts and rails are obtainable at low prices as compared with the costs of the real rock which has to be hewn by hand. Therefore, for $100 some very good results are obtained. The construction of the stile, the arrangement of the arbor, the setting of the steps, the hanging of the gate, the adjustment of the lamps and the general effect of the combination are what concerns the people. The fact that it may be real marble or granite and worth $500, or simply a cement structure costing $40 to $50, does not bother the people. They do not have the time or desire to observe, but when they see a great entrance, strikingly arranged and liberally lighted, they are pleased.

The Pittsburgh Portable Radiator.

The hot water system of heating is generally recognized as the best and most economical, and one reason it is not more generally used is due largely to the high initial cost of installing a hot water heating plant, which, plus the cost of maintenance, puts it beyond the reach of the average tenant. The designers of the Pittsburgh portable radiator, realizing the need of a heating system, combining all the advantages of hot water heat without the disadvantages of cost, now offer this device as a complete hot water heating plant that can be operated in units, when and where required, thus eliminating all the loss that occurs through radiation between boiler and radiator where heat is furnished from a boiler in cellar. Its first cost is said to be about one-third of a hot water heating system of equal capacity having a boiler in the cellar. In addition to economy and cost of maintenance, the convenience of portability and assurance of safety over cast iron radiators, combined with absence of worry and attention, are worthy of grave consideration when making the selection of a heating system.

This radiator is made of special boiler steel formed by heavy presses. This steel is the purest kind of commercial iron and, being free from impurities, does not absorb moisture and corrode, in that it is galvanized both inside and out as a safeguard against rust. Having a tensile strength and resistance and expansive capacity several times greater than cast iron, the walls of the Pittsburgh portable radiator are one-third the thickness of those made of cast iron, which permits greater and more rapid radiation of heat into the room. The radiator walls being one-third the thickness and the ends free from useless solid parts, without which it is not possible to make the old-style cast iron fix-

tures, the Pittsburgh portable radiator weighs less by two-thirds, which is a decided advantage. It is made in four sizes, for use with either manufactured, natural or acetylene gas, with the following capacities under usual conditions, with water in radiator at a temperature of 170°:

No.		Dimensions, in Feet.
B	will heat a room	10 by 8 by 9
C	" " "	12 by 10 by 9
D	" " "	14 by 12 by 9
E	" " "	16 by 16 by 9

at a costs of 3 cents per day using natural gas at 30 cents per 1,000 feet and is equally as economical on manufactured gas.

Description.—The Pittsburgh portable radiator is equipped with a patented high power burner of a peculiar construction that permits of the use of gas at varying pressures, producing a heat flame of very high intensity, generating the maximum of heat energy from the minimum of gas burned,

The mixer is adjustable and the gas valve is furnished, either for hose or solid connection. which can easily be made with a union joint, the absence of complicated parts making the connecting and operating simple. Connection can be made to the present gas service without disturbing same. The radiator filled with water, the gas turned on and lighted, immediate circulation takes place and continues as long as the gas burns, the temperature of the water being maintained at the same degree in all parts of the radiator. The heat is always under perfect control and can be adjusted to suit individual conditions, consequently there is no waste heat or gas wasted.

This radiator requires little or no attention other than occasionally adding a cup of water. It cannot generate steam, so the element of danger, through explosions, always present with steam equipment. is overcome by its use.

Coal and Coke Handling Plant at the Avon Street Gas Works, Bristol.

The *Journal of Gas Lighting* notes that at the meeting of the Institution of Mechanical Engineers at Bristol the last week in July, Mr. William Stagg, the Superintendent of the Avon Street Station of the Bristol Gas Company, read a paper on "Inclined Retort Coal and Coke Handling Plant at Bristol." The following extracts from Mr. Stagg's paper furnish particulars in regard to its equipments:

The author began by pointing out that as it is estimated that about 15 million tons of coal are carbonized annually in gas works in this country, the economical handling of this large quantity of material and of its principal by-product is of vital importance in gas undertakings, and he expressed the hope that it would afford a subject of interest to members of the Institution. In Bristol, which was among the first of the provincial cities to light its streets by gas, last year nearly half a million tons of coal and coke were handled. The oldest works are at Avon street, where there may still be seen a very interesting series of 10 retort houses built nearly a 100 years ago. In plan they present the form of a horseshoe, with a covered coal store occupying a central position and opening into each of the retort houses—all admirably adapted to the requirements of those days. They are a standing monument to the foresight and the enterprise of the pioneers of the gas industry in Bristol. For the greater part of the century that has passed since the introduction of gas lighting, little was done to introduce strictly mechanical methods in the handling of materials. However, of late, various forms of machines for charging and discharging horizontal retorts, with their auxiliary plant for handling coal and coke, have gradually come into use. Having given a short description of the earlier charging and discharging machines, projectors. and ram dischargers, Mr. Stagg referred to the combined charging and discharging machine of Messrs. Fiddes & Aldridge, by which the two operations are carried on simultaneously—the ram removing the spent charge carrying in the fresh charge of coal by the same movement.

Passing on to deal with the gravity method of charging and discharging retorts, as embodied in the inclined system, the author explained that it is characterized by extreme simplicity. The retorts are inclined at an angle to the horizon and the coal from continuous hoppers is dropped directly into the retorts through portable charging shoots. The recent introduction of coal projecting machines in conjunction with ram dischargers has to a large extent checked the progress, for the time being, of the inclined retort system, because with apparatus of this class retorts can be charged and discharged by the employment of a machine at one side only of the retort house—thus offering considerable advantage compared with the older forms of stoking machines, which work from both sides of the retort. Where the work is continuous, machines must be of the simplest, strongest, and most durable character to avoid the risk of a breakdown, and considering the conditions prevailing in which they are expected to work—the great heat and the cutting action of the coke upon the wearing parts—it may be wondered why any other method than the inclined system should be employed for charging retorts. However, greater care is necessary in the selection of suitable coal, and the success of the system depends, in a measure, upon the type of coals from day to day being fairly uniform. Some gas coals have a tendency to slip during the earlier stages of carbonization in inclined retorts, and in doing so a downward creeping movement readily sets in, leading to a thickening of the charge of coal at the lower end of the retort, thus rendering efficient carbonization difficult. Avoiding these slipping coals, Mr. Stagg said the system was as near perfection as could be attained by any method.

The author then proceeded to give the following particulars of an installation of inclined retorts at the Avon Street Gas Works: On the "new side" of the works three very substantial retort houses adjacent to the harbor were erected in 1860. In order to made the most of these buildings, it was decided in 1900 to raise the roofs and double the height of the walls, and by this means afford accommodation for inclined retorts. The dimensions of the houses and the general surroundings lend themselves admirably to this method of carbonization. The work was designed and carried out by, and under the personal superintendence of, the Company's Chief Engineer, Mr. Daniel Irving, and the work executed by the Gas Company's own staff and workmen. The coal can be lifted from the hold of the steamboat lying alongside the quay, weighed, broken, elevated, conveyed to any part of either three retort houses, charged into the retorts, and when carbonized discharged from the retorts directly on to coke conveyors, cooled, conveyed into the yard, screened, stored, and then loaded into carts or trucks without the material being once handled. The plant is divided into two sections—for coal handling and for coke. The power required is supplied by gas engines provided in duplicate for each section. The coal breakers and elevators are also in duplicate, and the coal can be placed in any part of the coal hoppers of the three retort houses from either breaker. The coal handling plant is designed to do its work, as far as possible, during the hours of daylight; 300 tons per day being required of it.

The determination of the angle of the retort, as might be expected, is a critical question. The ideal coal for working with is "nuts," such as will pass through a screen of 1¼-inch mesh. Compared with this lively type, small coal requires a steeper angle, especially if damp, and larger coal a less angle. An angle that would serve well in a newly built bench would be less suitable as the retorts become worn, in consequence of the formation of irregularities on the inner surface and of ridges at the joints, which impede the descent of the coal; and generally a steeper angle might be employed for discharging than would be suitable for charging. For a slipping coal, a less angle would be more serviceable. Lastly, the amount of vertical drop of the coal from the measuring chamber to the charging mouthpiece of the retort varies for each horizontal line of retorts, and introduces another disturbing factor, which requires some compensation, and which is provided for by introducing baffles and checks in the charging shoot. Obviously, then, a compromise in the angle is necessary to satisfy conflicting claims, and the angle decided upon is 31°.

The accompanying diagram (Fig. 1) shows a cross-section of the retort house. It will be noticed that the charging floor is placed upon a higher level than the discharging floor, allowing of this angle of 31° as the inclination of the retorts. High up over the retort mouthpieces on the charging side is a continuous coal hopper *A*, supported partly from the bracing of the retort bench and on cross-joists resting on the walls of the retort house. Over each vertical line of four retorts a measuring chamber *B*, for the charge of coal, depends from the hoppers—20 in all. In each of these chambers there is a slide at the top for filling it from the hopper, and another at the bottom for discharging, each worked from the charging floor of the retort house by a separate lever. The full capacity of the chamber is 7 cwt. This may be reduced by pushing in a flap-plate, which hangs hinged inside the chamber, held in position by a quadrant which passes through the back of the chamber, and is fixed by a pin. The weight of the charge of coal can by this means be adjusted to suit the prevailing conditions.

The method of charging the retorts is as follows: A portable stop-

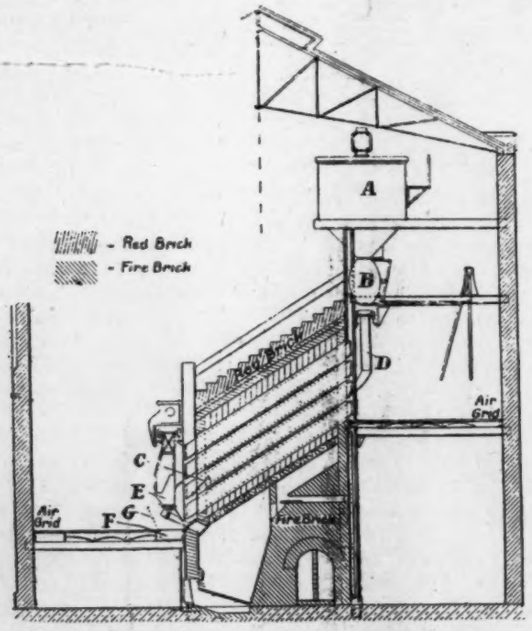


Fig. 1.—Cross Section of No. 3 Inclined Retort House.

plate *C* is placed in the retort at its bottom end, in order to prevent the charge of coal from resting upon the relatively cold iron mouthpiece, and from pressing against the retort lid. This remains in the retort during the period of carbonization. On the charging side are 4 shoots *D*, 1 for each horizontal line of retorts; the lower hinged end of one of these shoots is placed in a retort and the contents of the measuring chamber are discharged into it by pulling a lever—the coal forming along the bottom of the retort an even layer about 6 inches thick from the stop-plate to the upper end of the retort. These charging shoots are provided with adjustable baffles, and in the longer shoots fixed baffles also, for regulating the speed of the descent of the charge of coal—thus aiding the operator, who has the chief control. The weight of the charge is from 6½ to 7 cwt., and 20 retorts can be drawn and charged in 25 minutes. The retort lids and the face against which they close are machined, the retort being sealed by pressure from a lever with an eccentric crank.

The retorts are tapered, increasing in width towards the bottom ends to facilitate the discharge of the coke. In this installation they are arranged in sets of 8—2 vertical lines of 4 retorts under each of the 10 arches, each set being independently heated by producer gas on the regenerative system. A fraction of the hot coke as it is discharged from the top line of retorts is directed through a portable shoot hung on rails into the producer at *E*, the only manual labor necessary being to push it back in order to maintain an even thickness in the depth of the fire. The clinkering is done from the ground floor stage below. Owing to the regular heating possible in this system, the life of the retorts and of the setting is prolonged. A bench is still in action at the Avon street works in which the heats have not been once let down since August, 1904—having done continuous work for nearly 4 years.

Water-borne coal is unloaded by means of a steam crane and a Hone grab. The grab, of 15 cwt. capacity, discharges into a hopper weighing machine, in which the weight of the coal is indicated by a pointer on a scale of hundredweights. This arrangement permits of rapid weighings, as the shifting of the counterpoise is unnecessary. From the weighing machine it is discharged by a lever into the hopper of the breaker, together with coal received by carts, and there reduced to a uniform and suitable size. The breaker is a powerful machine capable of dealing with 30 tons of cannel per hour. The coal is fed in automatically by a shuffle plate to two double lines of steel claws on square shafts suitably inclosed. The breaking is done in two stages. The coal falls from the second pair of claws into the boot of the elevator. During its 6½ years' continuous work this has dealt with 368,000 tons of coal without having been once taken apart for repairs, notwithstanding the rough usage it has sustained from stray train coupling links, axle bearings and stones, which occasionally find their way in with the coal. The steel elevators are constructed of a central roller chain upon which buckets of 28 pounds capacity are fixed, 18 inches apart. They are driven from the top end by a sprocket wheel which engages the connecting chain. Projecting arms, fixed on each side of the buckets, slide on angle iron bars, which serve as guides. The coal is elevated to the full height of the lofty retort house walls, a total lift of 70 feet, and there delivered into the conveyors for distribution.

Each of the three retort benches is served by its own conveyor, fixed on cross-joists above the continuous hopper, and a fourth conveyor, at right angles to these, stretches from one elevator head to the other. This cross conveyor (Fig. 2) is fitted with reversing gear and clutches

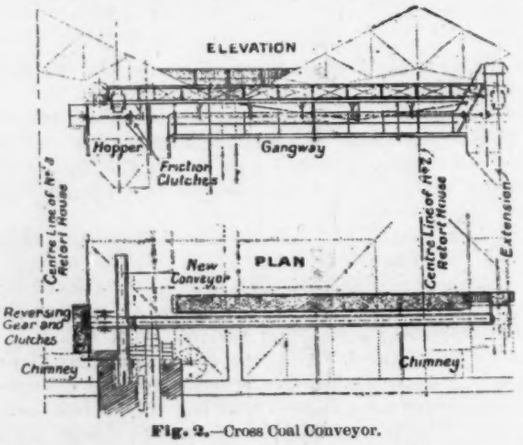


Fig. 2.—Cross Coal Conveyor.

and so arranged that coal from either elevator can be delivered on to each of the hopper conveyors, and thus serve all three benches in turn. These conveyors are driven from the elevator head by chain drives. The coal from the elevator is directed by a shoot into the trough of one of the conveyors, and along this the coal is swept by a continuous chain of push plates to the first open slide, where it falls either into the cross conveyor or into one compartment of the coal hopper.

It will be seen from Fig. 3 that the section of the trough of one of

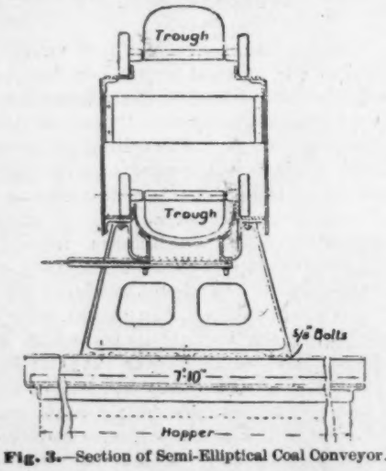


Fig. 3.—Section of Semi-Elliptical Coal Conveyor.

the conveyors is semi-elliptical. In this conveyor every third push-plate is provided with wheels and an axle, and the whole is connected up by a chain of the roller type, driven by a sprocket wheel at one end, which engages the rollers on the links of this chain. At the opposite end of the conveyor, screw tension gear is provided, which acts through a second sprocket wheel. The wheels carrying the push-plates run upon angle irons fixed at each side of the trough. A more efficient conveyor could scarcely be devised. It needs very little attention, and, owing to the slippery character of the coal, it requires very little lubrication. During its 6 years' work it has transported about 220,000 tons of coal. Such ample bearing surfaces have been provided that, excepting the bottom of the trough, where the coal falls upon it, the amount of wear has proved insignificant. In all the other conveyors the section of the trough is rectangular and every push-plate is provided with its wheels and axle. The coal moves along at the rate of 100 feet per minute. To drive the whole plant—consisting of two breakers, two elevators, two hopper conveyors and one cross conveyor—when running light, requires 35.89 I.H.P., and 35 per cent. more, or nearly 50 I.H.P., when dealing with coal.

The following is a description of the coke handling plant: Along the front of the retort bench, below the bottom line of retorts and below the floor level, is a rectangular trough *F* (Fig. 1), constructed of steel plates and angles, with cast iron renewable bottom wearing

plates. This trough is covered with ¾-inch plates with a hinged section *G* in front of each vertical line of retorts. The plates serve to confine the heat and steam to the trough as the coke is conveyed through the house, and when raised for discharging the retorts they serve as shields to protect the workmen from the falling hot coke. Beyond the house the conveyor trough is bent upwards at a considerable angle, becoming an elevator. This portion, being entirely inclosed, acts as a flue, and draws the steam from the retort house—discharging it at the top end entirely clear of all workmen. Along the walls of the retort house a line of wrought iron gratings takes the place of the ordinary brick floor, and allows a plentiful circulation of cool air in the house.

The coke and breeze storage hoppers rest upon pillars, and are raised sufficiently to allow carts to stand underneath the hoppers. They are divided into sections by bulkhead plates, corresponding with the screens, and below each pair of screens the hopper is partitioned off for breeze. Above and along the entire length of the hoppers, carried upon a lattice framing, there is a conveyor for distributing the coke. As the coke leaves the retort house it is quenched, and on reaching the top of the elevator it is discharged into the trough of the distributing or hopper conveyor, and either falls directly on to screens through the open slide beneath, or is carried to the next set of screens, where it is separated from the breeze, and each falls into the section of hopper set apart for it. To save the coke from breakage in falling into the hoppers, portable shoots are placed when required at the foot of the screens. The carts are filled by operating a lever from the ground level.

The form of conveyor chain adopted for the coke plant is the De Brouwer, which resembles a flexible ladder with crossbars of round and flat steel. Where the coke has to be taken up inclines, flat bars are introduced at regular intervals in place of the round bars. The conveyor, when new, moves along at the rate of 50 feet per minute. This speed is increased as the wear of the chain necessitates an increase in the diameter of the pitch circle driving sprockets.

In discharging the retort the coke slides down the inclined retort into the trough in front of the bench and is carried forward, sliding along the bottom plates. A little water lies in the bottom of the trough to keep things cool, and this helps to quench the coke as it travels along.

In spite of the trying conditions under which it has to work, and of the cutting and grinding action of coke, a chain may be made to last more than 3 years, working day and night, and transport 70,000 tons of coke during its life. The new chain weighs 50 pounds per yard; an old one removed to the scrap heap weighs 32 pounds per yard—showing a loss in wear of 36 per cent. by weight.

The chain of the conveyor is driven by a pair of sprocket wheels, engaged for 90° of the pitch circle. The slack chain is paid directly on to guide wheels, which maintain it in constant tension by a balance weight. The chain of the hopper distributing conveyor is kept taut by tension screws instead of the usual balance weight arrangement, which cannot be well applied where the conveyor has to be reversed. In this case the chain is apt to increase in length more on one side than the other. Sections of the chain have frequently to be turned over, to counteract this unequal wear and consequent difference in the pitch of the two sides. Judging from what takes place at the Avon street works, one would be inclined to think that the introduction of a balance weight in place of the tension screw would overcome the difficulty; but the experience at other works renders this doubtful.

The amount of power required for these conveyors is surprisingly small, and is supplied by a gas engine. A length of 1,540 feet of conveyor chain requires, when light, only 25.16 I. H. P., including two line shafts, belts and driving gear, and 12 per cent. more when fuliy loaded. So thoroughly reliable are gas engines, that for nearly 3 years' work was proceeding day and night, year in and year out, with a single gas engine. The rapidity and ease with which hot coke is removed from the retort house by conveyors adds much to the convenience and comfort of the workmen and to the general economy of the system.

Discussion.

The President (Mr. T. Hurry Riches) proposed a vote of thanks to Mr. Stagg for his paper.

The motion having been carried by acclamation,

Mr. W. H. Atherton (Derby), referring to the statement in the paper that the introduction of coal projecting machines and ram dischargers had checked the progress of the system of inclined retorts owing to the fact that they allowed of retorts being charged and discharged by machinery working on but one side of the bench, pointed out that this was not the only reason. Most gas works, he said, already had hand charged horizontal retorts, and the use of projectors enabled the old settings to be utilized and labor saving methods adopted with a small outlay of capital and no interruption of working. He, however, looked forward to seeing both horizontal and inclined retorts displaced by verticals in the course of the next decade. The latter was the ideal system in principle, as embodied in the Woodall-Duckham retorts. He asked the author if he could give the members some idea of the difference in capital cost of two new retort houses of equal capacity, one equipped with inclined retorts and the other with horizontals, both with modern appliances. Proceeding to criticize the details of the coal handling plant described in the paper, Mr. Atherton said in his opinion the receiving hopper below ground was unusually shallow—the inclination of the sides being only about 35°, and he asked the author if he had found that this was sufficient to allow the coal to flow freely. He thought the jigger-feed was better than the use of sliding doors alone, as with the latter the coal often became jammed and had to be stirred up by hand. The drive for the elevator head was unusual, and he considered a chain drive would be preferable, being more flexible and requiring fewer bearings. The three types of conveyor now used in retort houses—the push plate, the band, and the bucket—were all good; but the first named (the one shown in the paper) was probably the most convenient and durable where coal had to be deposited at a large number of points. The two forms of cross-section given in the paper had unusually deep push plates, necessitating room overhead and throwing great strain on the chains. He produced on the blackboard a sketch of a modified design of conveyor.

Mr. Canning (Newport) said the Directors of the Newport Gas Company decided some years ago to introduce coke handling plant, and they had used gas engines to drive it. These were very good, and thoroughly reliable; but electric motors had now been installed, because the work was spread over so large an area.[1] Coal was tipped from wagons into the hoppers, thence discharged into the breakers, and the rest of the operations were carried out on the lines described by Mr. Stagg, except that horizontal retorts were being used. As they had a separate electric motor for the breaker, the power could be measured with great exactness by recording instruments. Usually the power was from 8 to 12 E.H.P., though frequently it amounted to 20 E.H.P.—the figures in each case including the motor losses. When working with hard cannel coal, the motor took from 9 to 15 E H.P.; the power sometimes rising to 20 E.H.P. For such a load, he considered a gas engine was admirably suited as a prime mover. At Newport, owing to the height of the sidings, it was necessary to instal transporting plant for coal and coke, and they had decided on a telpher, working on a gradient of 1 in 22. Coke was dropped into wagons of iron basket work, which were lifted by the telpher and taken to the coke heap or elsewhere. The weight lifted was 1 ton; the speed of lifting being 60 feet, and of travelling 200 feet per minute. Hoisting the empty train consumed 3 E. H. P.; hoisting a full train, 7 E. H. P.; traversing a light train, 4½ E. H. P.; and traversing a full train, 7½ E. H. P. There was considerable advantage in using a telpher for coke, as it did not cause any frictional contact with moving machinery, which was highly objectionable. The author had stated that the chains extended by 10 per cent. in length as they became worn; and he (Mr. Canning) would like to ask him whether this was caused by the stretching of the links or wearing at the numerous joints.

Mr. D. Irving (Bristol), referring to Mr. Atherton's remarks in contrasting the methods described in the paper with others, and on vertical retorts, pointed out that the value of the projector lay in the fact that it was applicable to existing horizontal retorts. On the subject matter of the paper the speaker said nothing indicated the progress of mechanical engineering more than the fact that, in 8 years, the methods decribed by the author had become antiquated. The most advanced vertical retort system was at present in use at Bournemouth, and, as a continuous system, whereby the coal was automatically fed at the top of the retort and periodically removed from the bottom, it lent itself to very great economy in the handling of coal for gas making. The cost had been something 1d. per ton. But the fact that Mr. Stagg, who was intimate with the working of the inclined retort plant, was so enthusiastic, spoke volumes in its favor. The question of cost had been referred to. This was a delicate subject to speak of in these competitive times. He might say, however, that the estimate for their own works had not been exceeded, and the

1. In this connection reference may be made to an article by Mr. Canning on "Gas and Electricity as Sources of Motive Power."

provision of the mechanical appliances described in the paper had done much to reduce the arduous work of the men. [It was understood that Mr. Irving would send a communication in writing for inclusion in the "Proceedings."]

Mr. A. T. Tannett-Walker said his experience in handling coal was entirely in favor of grabs, which were cheap, simple and efficient. In an installation handling a million tons of seaborne coal from Cardiff annually, he had decided to use grabs throughout. The chain illustrated in the paper was of very ingenious construction.[1]

Mr. Charles Hawksley (London) remarked that costs were misleading unless they included every item, such as capital expenditure, upkeep, labor, insurance, etc. He therefore expressed the hope that if any statements of costs were given, all such items would be included, so that a correct opinion might be formed.

Mr. Stagg, in reply, said, with reference to the question raised by Mr. Atherton concerning the angle of inclination of the hopper, he must admit that it was insufficient—in fact, the hopper was not being used. As to the other point concerning chain drives, he said the drive described in the paper had always acted well, and he thought there was less friction than with a chain. Of the two sections of push plate conveyor which he had given, he infinitely preferred the semi-elliptical one (Fig. 3). With regard to Mr. Canning's remarks on electrical power, he was very much interested in the figures given for the power used by the coal breakers. He had no doubt that great and sudden variations of power did occur, as stated. Grabs were excellent things for handling small coal, but were useless for large coal. On the question of cost, he was quite convinced that there was a great saving in the use of machinery over hand labor, and he would not go back to hand work. He considered that the bulk of the stretching of the conveyor chains was due to wear at the joints.

[Continued from Page 225.]

FOURTH ANNUAL MEETING, IOWA DISTRICT GAS ASSOCIATION.

Held at Omaha, Neb., June 17, 18 and 19, 1908.

Second Day—Afternoon Session.

The Secretary read the following report respecting the proposal of

The National Commercial Gas Association to Come West

for its next annual meeting, as follows:

About three years since it was proposed, by Mr. L. S. Bigelow, Secretary and Treasurer of the National Commercial Gas Association, that there should be an organization formed in the gas field that should give its exclusive attention to the subject of the sale of gas and the appliances required for converting it into light, heat and power. Three annual conventions of the National Commercial Gas Association have been held in New York city. Each has proved a remarkable success, indicating the desirability of an exclusively commercial organization for gas men and gas appliance manufacturers, where all should be upon the same basis of membership.

The word "National" has been somewhat criticized as forming a part of the title of the Association, because of the fact that the only meetings thus far have been held in the East, namely, in New York. This, however, was explained by the Secretary of that Association in an address before the Illinois State Gas Association last March. Mr. Bigelow stated that, as in the case of a young eagle, it is better to stay in the home nest until the pinions have grown strong and the wing feathers have been well developed. Then it is safe for it to soar into other regions.

The National Commercial Gas Association continued to hold its conventions in New York up to the present on exactly that basis, but now the Association feels justified in going elsewhere to hold its next meeting. After this statement was made by Mr. Bigelow to the Illinois State Gas Association, that body voted to invite the Commercial Gas Association to hold its next convention in Chicago, December 8th, 9th and 10th, and coincident therewith an exhibition of gas appliances, the latter to be held in some one of the armories or other large area.

The resolution of the Illinois Association was passed unanimously and forwarded to the Commercial Association. Later, Mr. Bigelow addressed the Wisconsin Gas Association at its meeting held at Milwaukee, during which address he directed attention to what the Illinois Association had done. This resulted in unanimous vote on the part of the Wisconsin Association approving the resolution presented to that Association by Col. Pratt. The resolution read as follows:

"*Resolved*, That the Association expresses its appreciation of the action of the National Commercial Gas Association in deciding to hold its next annual convention and exhibit in the West, and that we, as an Association, second the motion embodied in the invitation extended by the Illinois Gas Association, namely, to make Chicago the place, and December 8th, 9th and 10th the dates, and that the Secretary be instructed to send a written copy of our expression to the Secretary of the National Association."

It seems to me that the Western State Associations might well vie with one another to make this Chicago convention of the National Commercial Gas Association a great success, for this is the first opportunity that the West has had to attend a purely commercial gas meeting where how to sell gas and how to create the sale of millions of feet of gas where thousands are sold to-day, will be the entire subject matter, plus, of course, relevant matter within the confines of the commercial side of the industry. Some 12 years ago an extensive exhibition of gas appliances was held in Madison Square Garden, New York, but not until the forming of the National Commercial Gas Association, 3 years ago, has there been put on foot any aggressive movement toward a large exhibition of appliances. The same came to be a special feature of the Commercial Association. The East had the big exhibition 12 years ago, and has had the more recent exhibits of the Commercial Gas Association. Now it falls to the lot of the West to enjoy this privilege. And should not the West show its appreciation of the opportunity and privilege by a hearty welcome to the National Commercial Gas Association in the form of a resolution to be adopted at this time, then by being present at the convention and exhibition in December, at the First Regimental Armory in Chicago, in large numbers, lending to the meeting that large measure of enthusiasm and push for which the West is so widely known? I might say in connection with this that probably large numbers have attended these Commercial Gas Association exhibits and found them very interesting and useful, and it seems to me, Mr. President, that a motion somewhat in line with those passed by the Illinois and Wisconsin Associations would be in order.

Mr. Clabaugh offered the following resolution and moved its adoption:

"*Resolved*, That the Iowa District Gas Association, embracing the States of Iowa, Nebraska and South Dakota, desiring to extend to the National Commercial Gas Association its earnest approval of the plan of that Association of holding its next convention and exhibition in the city of Chicago, and at the First Regimental Armory in that city, during the week of December 8th, 9th and 10th, 1908, does instruct its Secretary to send a copy of this resolution to the Secretary of the National Gas Association, promising its moral support toward making the Chicago meeting a notable success, at the same time expressing this Association's appreciation of the value to the Western gas fraternity of such a convention and exhibition as proposed." [Seconded and adopted.]

Report of Committee on President's Address.

Mr. Kellogg presented the following report on behalf of the Committee on President's Address:

Your Committee on President's Address, after due consideration of that able and suggestive document, wish to report their hearty approval of its tone, its suggestions and its recommendations. Our worthy President has therein drawn attention to some features of our industry and to the status of our industry before the communities respectively served, on which our members should reflect and with which it were well that public authorities and the public in general were better acquainted. The spirit of the address seems to be "They serve themselves best who serve the public best." This we believe to be the correct view, and the view already taken by prominent forces in our membership. These also have the view that they who indiscriminately attack investments in an industry so highly useful as ours are warring against the best interests of their own communities, an interest identical with our own.

We have pleasure in giving to the address our cordial approval and in expressing the hope that the Association will carry out its recommendations.

L. L. Kellogg,
Geo. McLean,
Thos. Crawford,
} Committee.

Upon motion, the report of the Committee was adopted.

The President—If there is no further business, we will proceed with the programme. I will call on Mr. George S. Forrest, of Iowa Falls, to read his paper on the

1. The chain referred to was designed by Mr. W. J. Jenkins, of Messrs. W. J Jenkins & Co., of Retford, the makers of the De Brouwer plant.

BOOKKEEPING OF A SMALL GAS COMPANY.

In outlining this subject our first thought is, "Whom are we to serve? Who is to be benefitted by the same?" I represent a town of about 3,500 people, and, looking over the State of Iowa, I find 90 gas plants of which 49 are what is known as "cold process," or gasoline plants. Of the balance but 26 are in towns of more than 5,000 population. Our friend, Mr. Waring, at our last meeting, in speaking of "Small Gas Plants" included everything in towns below 10,000 people; but I wish particularly to confine my remarks to those interested in towns of from 2,000 to 5,000 population, which, in number of plants, constitute the great majority in our State, and I presume, will hold good in other States as well.

A glance at the organization of these small plants usually discloses about the same proposition, viz.: The promoter has got in his work; has influenced the banker, the merchant, and the retired farmer to invest their money in the stock of an organization, holding out the inducement that it is to pay enormous dividends from the outset, with the usual disappointment and financial loss. I venture to say that, of the 64 plants in Iowa included in the class I am trying to cover, not more than half a dozen are paying dividends on the original investment, and many of them have been losing steadily from the start.

If you should ask me why I make such an assertion, I would answer: "The lesson taught by experience is generally well learned." Within the past 18 months it has been my pleasure to visit more than a dozen of these plants, and I find practically the same situation prevails at each one. Many of them have cost double or treble what they are actually worth and the machinery and equipment are now nearly worn out. No part of the investment is made by a practical gas man, or one who has any knowledge of any part of the business; therefore, he imagines any kind of an operator who can be taught to run an engine or a gas generator is good enough, and the cheaper such a man can be hired, the nearer he will come to breaking even at the end of the year. This is a fatal mistake. At least one practical, well trained, all-around gas man should be connected with every plant, no matter how small it is.

Many of the plants in my class I find to be 1-man plants. By this I mean that the gas maker makes the gas, reads the meters, sets the stoves, installs the light fixtures, looks after the troubles, etc. In many of these towns no office is kept open. "Must keep down expenses," is the cry. Yes, this is true, we must keep down expenses; but have we ever stopped to think where we are meeting the heaviest part of our loss? Is it in the cost of labor or the cost of material? Is it the cost of regairs and renewals or the lack of volume of business? Is there a shrinkage at the plant or a leak in the mains? Where should the manager exert himself the most? Should his first effort be in adding more customers or in satisfying those he already has by delivering to them a uniform product of good quality and under steady and sufficient pressure. The manager will find many such problems to be solved before he will be able to show his employers satisfactory returns on their investment. The oily-tongued promoter has told us we can put gas in the holder for 50 cents or 30 cents, and we can sell all we can make at $1.50 per 1,000. Assuming that we are operating a water gas setting, what are the items he considers? He says, "Such a number of pounds of coke in your generator, so many pounds of coal for steam, so many gallons of oil per 1,000, and labor so much." Presto! You have it. I believe we should go farther than this, especially at a time when popular opinion and general politics are combining to hammer all public utility corporations to the very limit for existence. In such times the small towns suffer more than the metropolis, because our people, not recognizing the difference in the cost of manufacture on a very large scale and on a small one, think we should be able to give them 90-cent gas or 75-cent gas just as well as the city that is putting out millions to our hundreds of cubic feet per day. Therefore, let us know just where we stand, and when we estimate holder cost let us not deceive ourselves, but rather let us consider every item of investment and the depreciation of the same, together with the interest, taxes and insurance, as well as the items of fuel, labor, etc.

As already cited, this small gas plant has a limited force of employees. I have operated a 1-man plant. I know what it means to do all the work, from the management and office work down to the making of the gas. It means long hours, and, perhaps, making the gas at night, in order to have the daylight for gasfitting and stove installations, and it was being forced into this position that led me to adopt my present system of accounts in order to determine where the leaks were occurring. I, as a stockholder, wanted to know why we were not making any money. I wanted to know what changes were necessary in order that we might make money. I imagine there are hundreds of stockholders all over the West who have asked themselves and their employees the same questions that I tried to answer and could not. I hope each of them may not be compelled to learn every detail of the business, as I have done, in order to save themselves; but, if they would know, they must have a system of accounts so simple that they can teach an ordinary gas maker to handle them correctly and accurately. There are certain items that they wish to compare each month, and with the corresponding month of the previous year, hence they must have a record very complete. My present method of handling 300 customers does not require, on an average, more than 30 minutes per day. It is so simple that one can use it for a very small plant, and still it is so complete that, with very little elaboration, it will answer for much larger plants than I am trying to cover. At this point I wish to state I am under obligation to the committee who have so ably worked out a uniform system of accounts, the forms of which I have modified and shortened. In this connection I must digress just a moment to compliment Mr. Floyd E. Johnson, of Mason City, for keeping the most complete system of accounts it has been my pleasure to inspect for towns of that size.

Going back to the original proposition, that the small plant must economize at every point, I assume they will hesitate before paying $30 for a customers' lodger, or $150 or $200 for a complete set of such books as are used by the larger gas companies, yet their records should be as complete and as easily referred to. Therefore, I have kept this item in mind, and the complete set which I am now using, good for a plant of 300 to 500 customers, ought to be furnished by any good publishing house for $25.

The meter register (Exhibit "A") requires rewriting the names 3 times a year. These may be inserted in the order of the location of the houses on certain streets, or alphabetically. I personally prefer the latter, for in our town, although residing there less than 5 years, I know the occupant of every house personally, and a glance at the house, when reading meters, is sufficient to know whether he uses gas or not. Then I have a loose-leaf general ledger, which contains all accounts in the same alphabetical order and saves time in posting. I believe these blanks are all self explanatory, hence, I need not elucidate upon the various columns, but hasten along.

Exhibit "A."—METER REGISTER.

Name.		Meter Reading.	Gas Consumed.	Dols.	Cts.	Meter.	When Paid.
.....	Present Reading.	....	....	.	..	....	....
.....	Last Reading ...	....	....	..	..	....	....
....	Present Reading.	....	....	..	..	....	....
.....	Last Reading ...	....	....	..	..	....	....
.....	Present Reading.	....	....	..	..	....	....
.....	Last Reading....	....	....	..	..	....	....
.....	Present Reading.	....	....	..	..	....	....
....	Last Reading....	....	....	..	..	....	....
.....	Present Reading.	....	....	..	..	. ..	....
.. ..	Last Reading....	....	....	..	..	....	....

[Front.]

METER REGISTER.

Meter Reading.	Gas Consumed.	Dols	Cts.	Meter.	When Paid.	Meter Reading	Gas Consumed.	Dols.	Cts.	Meter.	When Paid.
....	....	..	..	....	....	....	....	..	..	....	....
...	....	..	..	....	....	....	....	..	..	....	....
....	....	..	..	....	....	....	....	..	..	....	....
....	....	..	..	....	....	....	....	..	..	....	....
....	....	..	..	....	....	....	....	..	..	....	....
....	....	..	..	....	....	....	....	..	..	....	....
....	....	..	..	....	....	....	....	..	..	....	....
....	....	..	..	....	....	....	....	..	..	....	....
....	....	..	..	....	....	....	....	..	..	....	....

[Back.]

The meter reader's book (Exhibit "B") should also be arranged in the same order as the meter register, whichever method may be adopted. Here the names need only be written once during the year. Each month contains a column for meter reading, in hundreds, and a column for the cash from prepayment meters.

Exhibit "B."

	No.	Name of Patron.	January [to] December.			
			Meter.	Cash.	Meter.	Cash.

A common, 4-column cash book and journal combined is used for receipts and disbursements. I am partial to double entry work, and cross addition on footings, to prove the correctness of your work as you advance, therefore, I use double entry work throughout. The first two money columns are for cash receipts and disbursements, and the third and fourth columns are for journal debit and credit columns. My journal explanations are usually very brief; simply naming the accounts to receive debit and credit and referring to the number of the voucher and the number of the check, if any. All purchases of every kind are covered by receipted voucher Exhibit "C." To complete this is the voucher register (Exhibit "D") with the classification of accounts attached.

Exhibit "C" and "D."

No ..Date.....190..
Payee .. ..
When Paid.....

ACCOUNTS.

Crude oil. .....
Fuel. .....
Labor .....
Management.....
Stoves . .....
Fixtures .....
Plumbing material.
Plumbing labor....
Repairs to plant. ..
Repairs to mains...
Advertising.....
Expense .....
Amount.....

Entered by .....

Voucher for Payment } No.....
Issued by } $ .....
IOWA GAS COMPANY,
Iowa Falls, Ia.

To .....
.....190.

Date.	Description.	Price.	Items.	Amount.

Verified: Dated.....190.
Received of IOWA GAS COMPANY,
.....
Secretary.
Approved: ..... Dollars,
.....
President.
for payment in full of above amount.
..... Payee.
Please fill out, sign, and return this Voucher Promptly.

Exhibit "E."

IOWA GAS COMPANY.

Comparative Statement of Expenses for the Month of .....
19....and 19....and for the..... Month Ended .....
19....and 19....

	19..	19..	Increase (In Black) D crease (In Red).	Fiscal Year to Date. 19..	19..	Increase (In Black) Decrease (In Red).
Station Operating and Maintenance.						
1. Gas House Wages						
2. Coke in Pounds @						
3. Coal in Pounds @						
4. Gas Oil in Gallons @						
5. Gas used by Engine @						
6. Lubricants and Waste						
7. Iron Sponge or Oxide						
8. Water in Gallons @						
9.						
10. Repairs on Generator						
11. " Boiler.						
12. Repairs on Miscellaneous Equipment						
13. Repairs on Buildings and Fixtures						
14.						
Total						
Distributing, Operating and Maintenance.						
15. Rental, Installation, Arc Lamps, etc.						
16. Rental, Expense on Lamps						
17. Meter Installation						
18. " Expense						
19. Repairs on Mains.						
20. Customers' Repairs and Renewals						
21.						
22.						
Total						
General Expenses.						
23. Salaries of General Office.						
24. " Clerks						
25. Printing and Stationery						
26. Postage and Advertising						
27. Store Room Expenses						
28. Legal Expenses						
29. Rents						
30. Insurance						
31. Miscellaneous, etc						
32. Plumbing Labor.						
33.						
Total						
Total Operating Expenses.						
Earnings (Less Operating Expenses).						
Plumbing Material Bought.						
Gas Fixtures Bought.						
Stoves, etc., Bought.						

Exhibit "F."

IOWA GAS COMPANY.

Comparative Statement of Earnings and Expenses for the Month of .....19.. and 19.. and for the..... Month Ending .....19.. and 19..

	19..	19..	Increase (In Black) Decrease (in Red).	Fiscal Year to Date. 19..	19..	Increase (In Black) Decrease (In Red).
Earnings from Operation						
Gas Sales cu. ft						
Meter Rent						
Mdse. Sales Plumbing Material						
Gas Fixtures						
Stoves						
Plumbing labor						
Total						
Rebates.						
Total Earnings from Operation						
Miscellaneous Income.						
Total Gross Earnings						
Operating Expenses						
Gross Income						
Deductions from Income						
Interest on Funded Debt.						
Interest on Floating Debt						
Taxes.						
Mdse. Bought						
Total Deductions.						
Net Income						
Amount of Gas Sent Out						
Gas per Customers' Meters						
Gas used by Street Lamps.						
Unaccounted-for Gas						
Meters Set.						
Meters Taken Out.						
Total Number of Customers						
Gas Stoves Sold.						
Radiators and Heaters Sold						
Water Heaters Sold						
Hot Plates Sold						
New Services						
Cost of Coke per M for Gas in Holder						
Cost of Coal per M for Gas in Holder						
Cost of Oil per M for Gas in Holder						
Cost of Gas per M for Gas in Holder						
Cost of Lubricators for Gas in Holder						
Cost of Purifiers for Gas in Holder						
Cost of Repairs for Gas in Holder						
Total Cost for Gas in Holder						

A very few minutes each day will keep up the above mentioned books, and this may be done, if necessary, in the evening, while more

fortunate people are at the theater or otherwise enjoying themselves. At the end of each month the two statements (Exhibits "E" and "F") may be made out. Here is what your director or manager must rely upon as his source of information as to what is being done. When it is reduced to this form it is not hard to analyze. It is my opinion that item 14 on Exhibit "E" should carry an amount for depreciation which should be based upon a certain per cent. of the cost of the physical equipment required to manufacture the gas and put it in the holder. Item 21 might also cover the depreciation on mains, services, etc., in the same manner. I imagine you may prefer to omit the items on Exhibit "E" of "Mdse. Sales" and "Mdse. Bought," which would be proper with more time and an additional blank to cover same more in detail; but we prefer to include it here until such a time as we feel able to keep up a regular stock ledger and make a separate report on same.

The item "Amount of gas sent out" should be the amount shown by the station meter. We believe every plant should have a station meter, no matter how small. There are many reasons which I need not give at this time, but have a meter at the plant if something else must be dispensed with.

Exhibit "G" shows our form of main and service record with an application for service on the reverse side. These are kept on file for future reference. If these records are faithfully kept, much of the uncertainty of the business will be eliminated. At the end of the year, or as frequently as may be desired, an inventory should be taken of everything on hand. This will necessitate a correction sheet, unless it has been covered by an estimated per cent. for loss and shrinkage in handling material. For instance, assuming that you are making 25,000 cubic feet of gas per day, and using 1,000 pounds of coke, this would mean 365,000 pounds for the year, but we find we have bought and paid for, say 400,000, and have none on hand. The extra shovelful for good weight by the gas maker or the evaporation of moisture since weighed out to you on board the car may account for considerable of this shortage, but how are your records going to show it? My plan is to add a certain per cent. each month to the gas maker's report to make my sheet tally at the end of the year.

What we want are dependable figures; figures that tell us the exact

Exhibit "G."

No..... ....Street. Date..... ...
Name..... Order No..... Size Service.....

SERVICE RETURN—IOWA GAS COMPANY.

Size Tap..in. Size Main ... Depth Main...ft..in. Main is..ft..in. from .....Property Line. Main drips toward..... ...Street Service.....ft...in. from ....line of lot ....

PIPE.			FITTINGS.										
Size.	To be Charged to Consumer. Ft.	To be Charged to New Services, Ft	Street Tee.	Re'd Ell.	Re'd Tee.	Street Ells.	Ells.	Nipples.	Tees.	Plugs.	Bushing.	Strap.
⅜-in.	.....	....	....	....	...	....	....	....	....	....	....	....
½-in.	.....	.....	....	....	....	....	...	....	....	....	...	...
¾-in.	.....	... .	....	....	....	....	....	....	....	....	....	....
1-in.	.. ..	.....	....	....	....	....	....	....	....	....	....	....

Indicate fittings to be charged to consumer and make circles around the figures.
Service run by .....Foreman.

[Front.]

Labor.

To be Charged to Consumer.		To be Charged to New Service.	
Hours.	Rate.	Hours.	Rate.
....	.....	.....	....
.....	.....	.....	.....

Do figures on opposite side agree with main records?.....
Sketch or Remarks.

ORDER FOR SUPPLY PIPE.

IOWA FALLS, IOWA, ...

I hereby request and authorize the IOWA GAS CO. to introduce a gas service from its main into the building No ....Street. It is agreed that such service will be paid for by the undersigned at a rate not to exceed 15 cts. per foot.

I further agree that said company may hold and maintain this service as its sole property for the supply of its gas to the said premises.

Signature..... ..... Address..... .....

I, the consumer, agree to use and pay for not less than..... cubic feet of gas within one year from date service is run.

Consumer .....

[Back.]

results of the year's business, and tell it in such a simple manner that we may all understand it. When the time arrives that all gas companies keep their records in such a manner, and keep them complete with all items covered and subject to public inspection, we will have less complaints from municipal ownership advocates and less demand for a reduction in the price of gas.

Discussion.

Mr. Waring—Mr. Chairman, I think this is a very interesting subject to the majority here, because most of us are interested in small plants. I thoroughly agree with Mr. Forest in making this a short method, and I also am glad to see he recommended a uniform system of accounts, because in transferring properties it is very essential that we all keep the same system of accounts and classification, whether it is more concentrated or otherwise. If Mr. Forest has a system at his plant by which he can keep his books with 300 meters on only half an hour's work a day, he has an ideal system for small plants, for this elaborate system of bookkeeping that is necessary in large plants is precisely what we want to eliminate. I realize it is absolutely necessary in a large plant to keep an elaborate system, but it is also essential that we have a very simple form in small plants, and modify that as we go along down the line. I don't exactly agree with Mr. Forest on the necessity for a station meter in a plant sending out less than 25,000 feet a day. In the plant in which I am interested we are able to check very accurately from month to month by getting the daily send-out and the daily manufacture. We are able to estimate very closely by the rise and fall of the holder and our leakage runs about the same from month to month, taking into consideration the season.

The President—What would be the cost of a station meter that would register approximately 25,000 cubic feet per day?

Mr. Waring—The cheapest course would be a dry meter, and a 100-light "A" dry meter would do that, if anyone knows what that is worth. A wet meter would run considerably higher.

Mr. Vincent—I think a wet meter costs about $600 and a 100-light "A" meter about $150. A number of water gas plants in our territory have high pressure storage, and by watching their pressure gauges they can measure very accurately what they are sending out.

Mr. Green—I was thinking of that. We have a high pressure system and propose to depend on storage tanks. We will take the pressure each morning, turn one tank on the city, pump into the other two, and figuring up the pressure and taking our make from that. I don't feel like putting in an expensive meter in my small plant, and can't see from my viewpoint why that cannot be worked. If there is any objection to it I should be very glad to learn what it is.

The President—Would you like to have a uniform system of accounts similar to this in your plant?

Mr. Green I have just been trying to digest it. I would like to get hold of the forms. I am endeavoring to get up a new system myself; in fact, I have it partly perfected. I paid $27 for my consumers' ledger; the rest of my books so far as I have gone are very inexpensive. I would like very much indeed to get a uniform system that is simple and inexpensive.

The President—Have you less than 300 meters?

Mr. Green—I have about 260 now.

Mr. Carson—It seems to me with all this detail and elaborate system which we have for keeping track of business in small plants, to do away with the station meter is to kick the foundation from under you. Assuming that a station meter costs $600, interest and depreciation we would say would amount to 12 per cent. or $72 a year—$6 a month. I would like to ask how much time a man puts in keeping track of a holder and counting the rivets on it to see about how much gas he has made and how much he is losing? A station meter is almost indestructible. I operate a plant in a town of 5,000, and one of the first things I did was to put in a station meter. I found it a very good investment.

The President—Do you use the uniform system of accounting in Washington?

Mr. Carson—No; we use a 6-column journal cash book, and in that way, of course, we can keep track of the records very easily by taking everything on the journal cash book, then having a petty ledger and charge book. It is rather a simple way of taking care of the accounts.

The President—Would you like to have the uniform system of accounts, if it could be made simple?

Mr. Carson—I wouldn't want to adopt anything as elaborate in a town of that size.

The President—Have you less than 300 meters?

Mr. Carson—No, we have more.

Mr. Borden—Our system of accounting is more or less based on a special order. I have never had very much experience in inspecting the methods of accounting in other plants. I think there are some very good points taken in this system Mr. Forest elaborated upon, but I don't know that I could say on the face of it just what those advantages are over probably a great number of styles of accounting. I think, however, if we could agree upon some one method of general accounting, it would be of great value, especially along the lines that Mr. Waring mentioned.

Mr. Waring—I have given much thought to the matter of a station meter in a small plant, and am unable to see where we are going to save any money by putting one in. Efficiency in a small gas plant amounts to very little. A station meter will give a line on leakage

and on efficiency, but if the output of a plant is 10,000 feet a day or 300,000 feet a month, $6 a month for interest and depreciation means 2 cents per 1,000 feet. Where will that be saved? A small gas plant should be erected at the lowest possible cost; even then it isn't going to make anybody rich. I have tried it; those of you who haven't tried it, don't do it. Assuming the sale of gas is 20,000 feet a day, the cost of a station meter is 1 cent per 1,000. How is that 1 cent going to be saved? It may be a satisfaction to do that, and it would be nice to have an elaborate office; but it is not going to pay. Have desk room in somebody's storeroom and pay $5 a month for it. Make an arrangement by which you can pay somebody something per month for keeping your books. You must keep down the labor costs; that is the principal thing in operating a small gas plant. Efficiencies don't amount to anything. Oil and generator fuel are small parts in the operation of a water gas plant. Interest on your investment and labor charges will about put you in the hole; you can just figure that up any time you want to. Those are the things causing little plants to go into the hands of a receiver.

Mr. Carson—I think the gentleman makes a mistake. The plant I have in mind didn't have a station meter. They thought the leakage was a certain amount. Their office was down at the gas plant. If a person wanted a gas stove or appliance one could go there and get it. There was no advertising in the papers—no need of it. Everybody knew where the gas plant was; it was the only one in town. I don't say this to be boastful, but only to show what turning things up will do. We spent some money on the works to get things in shape so that we would know where we were. We found the leakage was over 33⅓ per cent. and that the cost of making the gas above what the leakage should be was absolutely a dead loss. We did away with the office at the works and hired one uptown at $25 per month, right near the main street. We advertised and sold 50 gas stoves the first year. I claim that success does not depend on whether you can get your superintendent for $35 or $40 a month, but on whether he is going to make good in getting the business. In other words, to make the business profitable you must increase your output so that your gross sales will amount to such a sum as will enable you to run the business properly. It is false economy to try to operate unless you know exactly where you stand.

Mr. Waring—The gentleman seems to think that the leakage proposition was taken care of by the station meter. I fail to see why. He He states it was 33 per cent. If he hadn't been selling any gas at all it would have been 100 per cent. He moves up town and gets a bigger soliciting force and naturally reduces his leakage.

Mr. Carson—That is not the point. When we knew what our meter leakage was we got after it and had it straightened out inside of 3 months; before that we didn't know. They always claimed that the leakage was about so much, by counting the rivets on the tank and that sort of thing. A meter is like a scale or any other appliance of that kind; it must be accurate. You must know how much you are selling and how much you are making of it. If it hadn't been for the meter, how could we have told what the leakage was? The man who was operating the plant would think he was keeping his leakage down. He wasn't going to give out that he was losing a third of all the gas he made. He would lose his job if he did.

Mr. Heaton—Does Mr. Carson think it probable that, if an effort were made to keep a close record of all the gas made by the operator using high pressure storage, it would be possible that the leakage would be so great without knowing? That is one thing in which I am very much interested, and if it is a matter of economy to have a station meter installed sufficient to justify the expense, I would like to know it. As I said yesterday, ours is a small plant and has been running but a few months.

The President—How many tanks have you?

Mr. Heaton—Two.

The President—Can you run one and measure the other?

Mr. Heaton—We use what is known as the Tenney system; perhaps Mr. Tenney will explain these conditions.

Mr. Tenney—In the plant at McCook, as installed, each tank can be run independently. A pound pressure upon one will give about 133 feet of gas. Our experience with them is they will tally within 1 per cent. of a good working meter, and we have also found that 9-tenths of the meters of the type used in this section of the country that have been in operation 2 years are out of order most of the time.

The President—What correction do you make for the difference in temperature of those tanks?

Mr. Tenney—It is slight. It won't vary over ½ of 1 per cent. It is not difficult to get at.

The President—Are there any other features in this paper on accounting that you would like to have discussed? Because you are starting a new gas company makes it particularly applicable to your situation.

Mr. Heaton—I don't know that there is. I had some correspondence with Mr. Forest at the time we were starting up regarding a system of bookkeeping, and I think it is very thorough and complete. It seemed to me a little more elaborate than necessary, but I believe it is a very good idea to adopt the uniform system.

The President—May I ask you why you didn't adopt it?

Mr. Heaton—Well, we were not sure at the time that it was the best system, and we decided to adopt one not quite so complicated.

Mr. Gates—Ours is a system gotten up myself. As I am not a bookkeeper at all it would be pretty hard to explain it.

The President—Would such a system as this be applicable to your plant?

Mr. Gates—I think so.

Mr. Waring—Mr. Nation, from Shenandoah, has a station meter. We would like to know of what value he finds it.

Mr. Nation—I haven't been there long enough to tell you much about it. They tell me that the percentage of loss is very small according to the meter. This system of accounting is the same as we use.

Mr. Waring—I asked about Shenandoah because the last time I was there, before Mr. Nation came, they didn't see anything to be gained by using their station meter and had by-passed it. I thought that might be the case in a great many small plants where they put in station meters. I think Mr. Houck, of Dell Rapids, could give us some valuable information. I believe Dell Rapids has a population of 1,400 and he has 215 meters, and I don't believe any other works represented here can show a record like that. I think it would be valuable to get his system of bookkeeping.

Mr. Houck—I came here to acquire knowledge rather than to impart it. I haven't looked over this system thoroughly, but wish to do so. We have no uniform system at present, but hope to work into that plan as soon as possible. We have no station meter, and it seems to me it would be easy enough to find out the situation without one. If a record is kept of the gas made each day, by the reading of the meters at the end of the month you would find out whether you had any great loss.

Mr. Kidder—This is my first meeting with the Association. I was interested in Mr. Waring's and Mr. Carson's discussion respecting the station meter. We have none. I have a gauge which the gas maker can see when he makes gas, and he keeps track of every run, of how long he blasts and how long he is making a run. He figures down into the 100 feet. When he stops a run he knows what he stops with, and for the last 200 feet while he is making a blast he keeps track of that. At the end of the month, when the report comes in, I can figure up and tell how many feet he has made. Then I figure up the number of minutes he has blasted each day and the number of minutes he ran, and take the loss he had during his blasts (which we will say will amount to 2,000 feet a day) and if he has blasted twice as long as he runs, I will say that he used 1,000 feet more that day while he was making his run. My holder is 23 feet high, and it has a gauge holder of 1½ feet that runs over a pulley and gets inside of the building. For my part, I don't see any need at the present time of a station meter. We made over our plant last year from an out-of-date oil plant into an up-to-date water gas plant.

The President—Do you find this system of accounts applicable to your works, or is it similar to the one you use?

Mr. Kidder—I am rather muddled on the account business. Starting in to have things nice, we ordered a card system from Chicago, and thought we had a good system, and I believe we have. Then I thought I would hire a bookkeeper to simplify the method of bookkeeping because I never had much of it. I will have a set of books to suit myself some day, and I think this is a good deal like what we want.

Mr. Haskell—I am sorry I did not hear the paper read. I want to say a word about that station meter. I have a gas plant something like the brother who just spoke has. I simply take the counting machine from the printing office, compute the exact contents of the holder as it goes up and down, which is very easy to do, and at the end of the month I can compute on that scale just how much has gone into the system. With reference to having a meter that won't work, we keep a record of the gas going into the holder, and it doesn't tally at all with that which goes through the station meter. When I find there is quite a little shrinkage I know there is something to look after. I began to really put this in practice last month.

Mr. Kellogg—In regard to station meters being unreliable, that may be true when they are not taken care of, but certainly a station meter is a reliable instrument for more than a year or two. It is some trouble to take care of, but I cannot imagine any reason why a company would not use it if they had it. According to my experience it should be good for 10 or 12 years if properly cared for. Of course, they must be tested and repaired occasionally.

Mr. Vincent Are the station meters referred to by Mr. Tenny wet meters or some form of dry meter?

Mr. Tenney—Usually of the dry, cast iron type.

Mr. Vincent—Then they are not the station meters we have in mind; they are simply a natural gas, dry meter.

Mr. Haskell—I would like to ask if Mr. Tenney thinks that plan of mine is all right for measuring gas?

Mr. Tenney—Explaining Mr. Kellogg's statement a little further, I wish to refer to the station meter at Mason City, Ia. It is of the better type and a wet meter. That station meter has been out of repair at least one-fourth of the time since it was installed, and it cost more than $2,000. I can quote you other instances where that is true. Another statement while I am up is to answer Mr. Haskell's inquiry in part. I think Mr. Kidder's method a very incorrect measurement. Gas as ordinarily delivered from a water gas set into a holder will shrink at least 10 to 15 per cent., so that his tallying on his holder would be very incorrect if taken from the meter readings. I think in Mr. Haskell's case that is partially true.

Mr. Heaton—I would like to repeat to Mr. Kellogg the question I asked Mr. Carson a moment ago. Does he think, if a closer effort is made to keep a record on the make of gas, it would be possible that

there would be such a discrepancy as to justify the small plants in putting in station meters, provided they would have to be renewed every 10 years? To the small plants that would be an extremely large expense. Could there be such a leak as to justify them in that expense?

Mr. Kidder—As Mr. Tenney says there is a shrinkage of 10 or 15 per cent. on going into the holders. I would like to know what is the difference whether it shows on the board or on the meter? Most station meters are set between the purifying boxes and the holder, and if the gas goes through the meter in that way it surely shows the shrinkage; but if goes on the board it shows the same.

Mr. Tenney—Your output is perhaps 30,000 feet per day, which would be made in a radius of 2 or 3 hours, 4 hours probably, at the outside. During the balance of the 24 hours that gas would have a chance to cool off and shrink, and the condensible vapors would drop out in the form of coal tar, moisture, etc. The shrinkage would, I think, be equal to 10 per cent. of the ordinary make of water gas. For that reason, if your send-out happens to be large during the time you are operating, your station meter is not correct and you get a discrepancy in the same way.

Mr. Kellogg—It seems to me the question of station meters not being used where they have them in is certainly a careless proposition. The question of installing a station meter is another one altogether. If you already have it, you don't have to renew it. The case is good for 50 years, the only thing that has to be renewed is the drum. I know of station meters that ran 20 years without being renewed (even the drum) and I have known them to be renewed in 8 or 10 years. That depends on the water and the gas.

Mr. Vincent—As to the shrinkage in volume in gas, the proper way to use a station meter is to have a thermometer on the outlet and use a correction table for the temperature. In that way you will get a very accurate measurement of the actual amount of gas made.

Mr. Waring—I don't want to leave the impression here that I don't believe in keeping up a meter after you have it in use. I think that it should be kept in repair and used to the best advantage, but I say that in a small plant we don't need an exhauster or a station meter, although in larger plants we can't get along without them. A tenth of a cent in a large plant amount to an enormous sum in a year, but 10 cents doesn't amount to very much in a small plant.

Mr. Chubb—In regard to efficiency, I had occasion to look over a small plant about 2 months ago. They had a station meter but didn't know how to use it. I found that they were running about 6½ gallons of oil per 1,000. We got the station meter into use, and this last month it was below 5; 1½ gallons per 1,000 is a good deal.

Mr. Forest—It has been a mooted question for some time as to whether a small gas plant could afford to invest a matter of $300 to $500 in a station meter, or whether it would be better to invest $100 to $150 in a dry meter. I wanted to ask Mr. Waring which he thought advisable, in the case of a meter plant or a high pressure system, to install the meter before the gas goes into the holder or as it comes from the holder and passes into the mains?

Mr. Waring—I would never put anything but a governor between the holder and the mains. The only other thing to do is to put it at the inlet. Never put any apparatus at the outlet of a holder except a governor, which I think also may be an unnecessary expense in a small plant.

Mr. Forest—Of the 65 or 70 plants (69, I think it is) in the State of Iowa, in towns of 4,000 to 5,000 people or less, probably every one is operating from a high pressure storage tank, therefore, it is necessary to have some kind of a reducing governor upon the mains. In the majority of cases the meters have been installed between the reducing governor or gasometer (or aerometer, as our friend from Nebraska calls it) and the main. Whether that is proper or improper is the point I want brought out. I wish to bring out this discussion on the meter question to know whether or not an investment of $500 or $600 (I think prebably somewhere between those amounts would buy a 4-foot or 5-foot meter) would be a paying investment. Our experience with leakages has shown us that the station meter is a good investment. I believe, further, that the manager can get more efficiency out of his gas plant if he has a constant check on it every day that he can't get back of. Of course, as stated in my paper, you must expect a shrinkage in buying coke, especially with the small plants that don't use it immediately. I proved this by a test at one time. When I unloaded a car of coke I weighed out 1,000 pounds and set it aside. Whether anybody stole anything out of it I can't say, because I didn't stay there night and day to watch it; but after a matter of 3 weeks I weighed it again and had 915 pounds. I call that a decided shrinkage. I don't say that the people who shipped this coke did not give me honest weights, but I do believe that there is a decided shrinkage from the time it is loaded until it is used, particularly with gas house coke. Some little confusion has resulted from my statement of the form that I am using, but I was simply adding to it a little information that I wanted each month. In a great many of these plants the owner is a foreign stockholder or a local man interested in some other business. He probably has a capable and efficient man to look after his business as far as the manufacturing end is concerned, but he wants the records kept in such a way that they will show comparative results at the end of each year. This system is simple enough so that any man who has a knowledge of bookkeeping can handle it, and the stockholder can keep in touch with his gas maker or manager and keep him constantly feeling that he has an incentive to push ahead and gradually advance. Mr. Heaton, I think it was, made the remark that this system is too complicated. I will venture to say I can take any gas man operating a plant, no matter what his nationality, and in a week's time teach him to keep his accounts just as accurately as I can myself, although it may take him a little longer time to do it. There are other points in the paper that I wish had been discussed, but as it is getting late we will simply omit them for the present.

Upon motion, a vote of thanks was tendered to Mr. Forest for his paper.

(To be Continued.)

The Du Bois Suction Gas Producer.

Iron Age says it would seem almost like "carrying coals to Newcastle" to install a gas producer plant in the natural gas fields of Central Pennsylvania, but the Du Bois Iron Works, Du Bois, Pa., considers that it has made such a commercial proposition. The suction producer which it now builds was designed by the company's chief engineer, Peter Eyermann, and is an independent plant offered as a competitor in economy with dependent natural gas plants.

Du Bois is located where natural gas can be had at 20 cents per 1,000 feet. This fuel when used for power purposes is consumed at an average rate of about 10 to 12 cubic feet per horse power per hour, varying somewhat with the quality of the gas, the heating value of which often runs considerably below 1,000 B.T.U. per cubic foot. In this same district hard coal can be had at about $4.50 per ton, yielding about 150,000 cubic feet of gas in the suction gas producer. Such gas would therefore cost 3 cents per 1,000 cubic feet, as compared with 20 cents for natural gas. However, the consumption of an engine run on producer gas is higher, so that approximately 70 cubic feet per horse power per hour is required, or in the neighborhood of 6 times as much as for natural gas, so that the fuel costs compared become 18 to 20 cents. On this basis producer gas for power appears to be as cheap as natural gas.

Fig. 1 herewith shows the general appearance of a producer of the new type. Fig. 2 shows a sectional diagram of the apparatus as connected to a gas engine and also gives a thermal analysis of the heat supplied, that lost at different points, and the heat equivalent of the power realized at the engine, assuming the coal charges to have a calorific value of 13,500 B.T.U. In 4-hour test runs of this plant the coal consumption ran as low as ¾ pound per horse power per hour. Fig. 3 is a view of the engine installed at the Du Bois Works, which, as may be seen is driving an electric generator belted to the engine. The engine is of the Du Bois standard tandem type.

The producer or gas generator is of the automatic suction type, in which the gas is produced as determined by the suction action of the engine according to its load—*i. e.*, the gas is automatically generated in corresponding amounts. The air for the combustion and gasification of the fuel in the producer enters the latter near its bottom, already warmed to a certain temperature proportioned to suit the conditions. The air is also saturated with moisture before it enters beneath the grate. The grates are of the plain horizontal type as used on ordinary boiler furnaces and are easy to attend. Attention once an hour is usually sufficient. Tests were made with a ¾-load on the engine running for 16 hours without any other attention to either the engine or the producer.

The producer is contained in a single shell resembling a boiler shell, strong enough to withstand any explosion pressure which might be created within it from ignorant or careless attendants. The top of the producer is protected from the intense heat of the inside fire by arch bricks which prevent damage to the upper part. On producers that are not protected in this respect it frequently happens that the top plate or the feeding hoppers crack, putting the producer out of commission. In this producer the cool feeding apparatus is simple, consisting merely of the upper seal, the middle bell and the lower magazine, Poke holes are provided through which the fire may be poked as required by a bar which fits in ball joints ground in independent bushings, so that there is no interruption to the continuous evolution of gas in the producer, even while the poking is going on.

From the producer the gas is discharged near the top and passes through the combined vaporizer and economizer. This vessel is located between the producer and scrubber and is made of cast iron to insure long life. Soft steel is not as suitable for this part on account of its being affected by moisture and sulphur. The device used in this producer plant does away with one usually inconvenient feature, since it has no stuffing boxes to repack or pipes to calk. The hot gas passes through a water seal and automatically overflows to the vaporizer, as the latter is constructed on the principle of a flash boiler. A large water volume is not required in producer vaporizers, as is the case in boilers on account of the varying load on the engine. On the contrary, large water volumes are detrimental, as they require too long a time to be heated up properly for the start of a gas engine. The Du Bois producer is, therefore, admirably adapted to deliver the proper quality of gas at any time. The upper water seal allows also an entirely independent expansion of the producer and vaporizer, avoiding leaks in the hot gas pipe flange joints.

The scrubber and drain arrangements are designed in accordance with the best practice in such devices. There are no parts in them likely to become plugged, and after the water inlet value is once properly regulated nothing further needs attention. Perhaps the most important feature in this part is the water sprinkler, which can be taken out and cleaned from deposits while the engine is running and without interfering with the operation of the plant. The gas before entering the engine passes through a dry purifier to remove the last particles of coal dust or water which may have been carried on with the gas. [For illustrations see following page.]

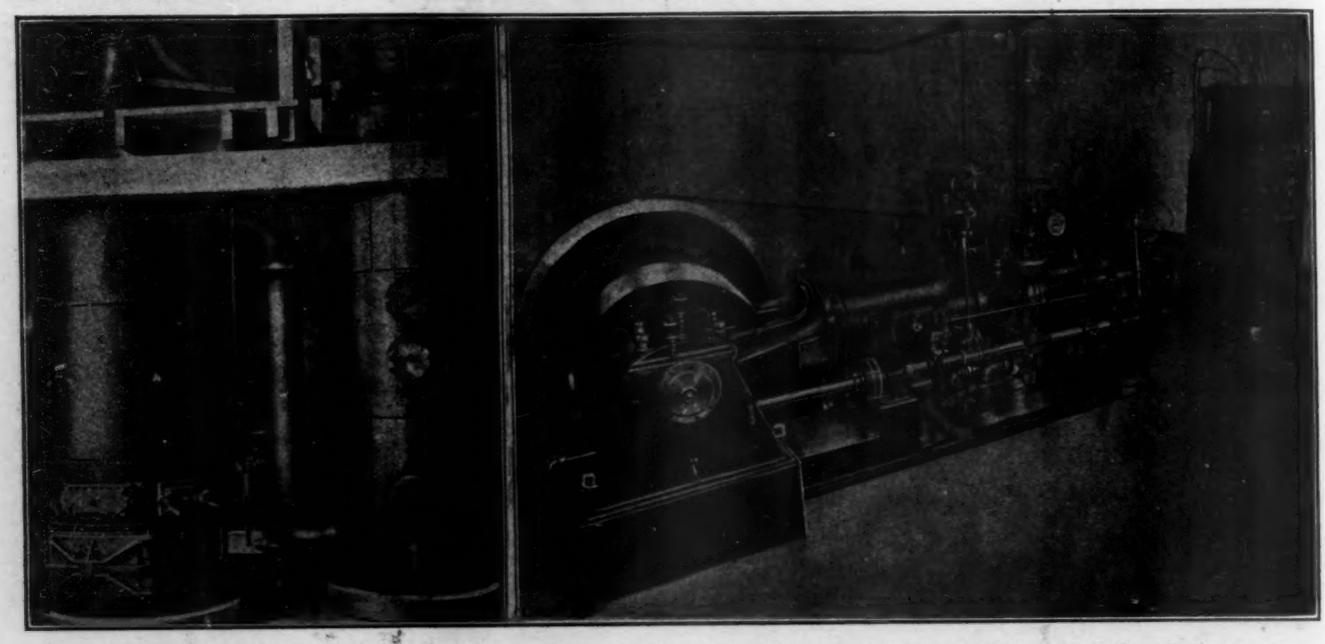


Fig. 1.—An Installation of the New Suction Gas Producer, Built by the Du Bois Iron Works, Du Bois, Pa.

Fig. 3.—The Du Bois Tandem Engine Installed in Connection with the Producer Shown in Fig. 1.

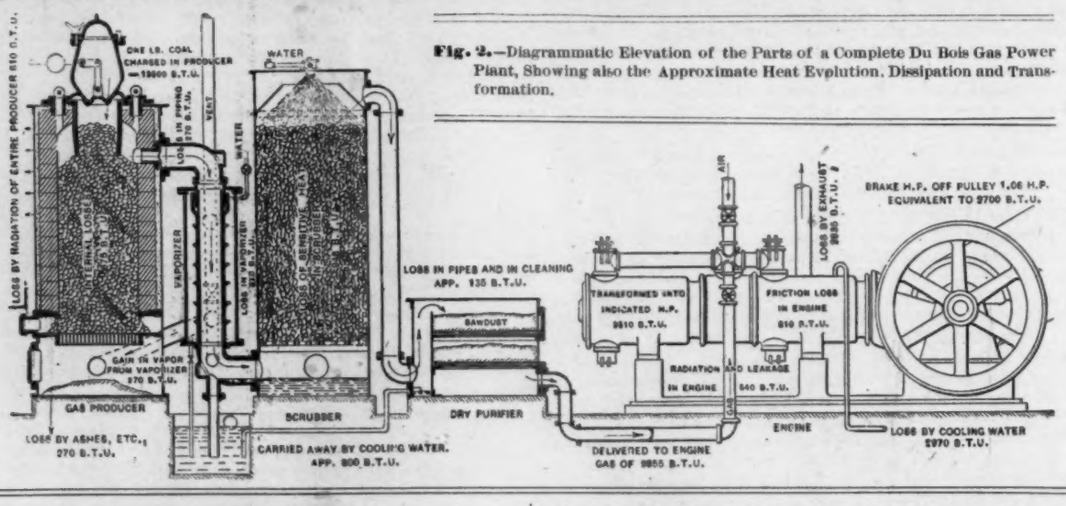

ONE LB. COAL CHARGED IN PRODUCER —13000 B.T.U.
WATER
LOSS BY RADIATION OF ENTIRE PRODUCER 810 B.T.U.
LOSS IN PIPING 270 B.T.U.
VAPORIZER
LOSS IN VAPORIZER 387 B.T.U.
GAIN IN VAPOR FROM VAPORIZER 270 B.T.U.
GAS PRODUCER
LOSS BY ASHES, ETC., 270 B.T.U.
SCRUBBER
CARRIED AWAY BY COOLING WATER, APP. 800 B.T.U.
LOSS IN PIPES AND IN CLEANING APP. 135 B.T.U.
SAWDUST
DRY PURIFIER
DELIVERED TO ENGINE GAS OF 9855 B.T.U.
AIR
LOSS BY EXHAUST 3820 B.T.U.
BRAKE H.P. OFF PULLEY 1.06 H.P. EQUIVALENT TO 2700 B.T.U.
TRANSFORMED INTO INDICATED H.P. 2810 B.T.U.
FRICTION LOSS IN ENGINE 810 B.T.U.
RADIATION AND LEAKAGE IN ENGINE 540 B.T.U.
ENGINE
LOSS BY COOLING WATER 2970 B.T.U.

Fig. 2.—Diagrammatic Elevation of the Parts of a Complete Du Bois Gas Power Plant, Showing also the Approximate Heat Evolution, Dissipation and Transformation.

Items of Interest
FROM VARIOUS LOCALITIES.

MR. THOMAS CRAWFORD, General Manager of the Clinton (Ia.) Gas Light and Coke Company, aided and abetted by some friends who evidently know good things when they see them, has purchased the gas plant and franchises of the gas enterprise at Maquoketa, Ia. The plant that now stands (?) there is of the nondescript sort, and it will be dismantled immediately, to be superseded as soon as possible with a plant equal to the necessities of this growing Iowa settlement. Manufacturers should communicate at once with Mr. Crawford, for it is the purpose of himself and associates to send gas out in Maquoketa by December 10th.

MAQUOKETA is the capital of Jackson county, Ia., and is located not far from the south bank of a similarly named river. It is midway of Clinton and Davenport, and is connected with these centers by the Chicago, Milwaukee & St. Paul and Chicago & Northwestern Railways. It is quite a manufacturing center, notable industries thriving there being concerned in the working up of wool and grain. It has a population of 9,000 or so, and is growing rapidly, the growth being of the best sort.

"W.W. L.," writing from Philadelphia under date of the 14th inst., informs us that the Gas, Electric Light and Power Company, of Van Wert, O., has been sold by the Gas and Electric Development Company, of Philadelphia, to a syndicate of Van Wert and Philadelphia people. A new Company has been formed under the name of the Van Wert Public Service Company, and has already taken possession. Many alterations and additions are planned.

MR. JOHN T. ECKHART, formerly on the distribution force of the Consolidated Gas Company, New York city, has been appointed Superintendent of Distribution to the Queens Borough Gas and Electric Company, Far Rockaway, N. Y.

MR. CLARENCE J. THOMAS has resigned the post of Secretary of the San Antonio (Tex.) Gas and Electric Company. The place of Assistant Secretary to the Company has been created, and Mr. R. C. Jones, the Purchasing Agent of the Company, has been appointed thereto. Meanwhile the Secretaryship is vacant.

TREASURER LEWIS LILLIE, of the Welsbach Company, announces that the regular quarterly dividend of 2 per cent. is payable the 1st prox.

V. M. BURGESS, writing to us under date of the 13th inst., says: "I am sorry to have to inform you of the death of Mr. Edward Burgess, whose connection with the Monmouth (Ills.) Gas and Electric Company dates back to 1890, who died the afternoon of the 9th inst., after a lingering illness. Deceased was born in Franklin township, Des Moines county, Ia., and on reaching his majority went to Monmouth and was employed by the Gas Company. He was studious, methodical and ambitious, and eventually became its Superintendent. It was under his direction that the plant was reconstructed some 4 or 5 years ago. He is survived by two brothers and three sisters."

THE Schaefer & Budenberg Company, of Germany, has disposed of its plant at Foxboro, Mass., to the Industrial Instrument Company, which was lately organized, with Mr. Bennett B. Bristol at its head. The Standard Gauge Manufacturing Company will operate the plant. The officers of the latter are: President, Watson E. Goodyear; Treasurer, Bennett B. Bristol; Secretary, Arthur E. Mundy.

COL. I. C. COPLEY sailed for Europe last Thursday, from New York, on the "Arabic" of the White Star line. The itinerary includes Liverpool, London, Cologne, Berlin and Zurich, at all of which points the Colonel proposes to make close inspection of the gas and electric lighting plants; also, to study the central power stations, especially the Swiss systems, for the Colonel is contemplating great construction plans in connection with the Western United Gas and Electric Company. The trip will cover perhaps 6 weeks, certainly not less. Mrs. Copley accompanies him.

THE Buffalo (N. Y.) Gas Company has notified Colonel Francis G Ward, Commissioner of Public Works of that city, that if arrangements are not made by September 10th for the payment of the city's overdue gas bills the supply will be cut off from the street lamps and from all public buildings. The city has paid out nothing on this account since July, 1907.

THE properties of the Dowagiac (Mich.) Gas Company may be put in the hands of a receiver, on the petition of Charles H. Kimmerle, Trustee in bankruptcy for Messrs. Lyle, Gage & Co.

MR. T. L. WATTS, writing from Bristol, Tenn., under recent date sent this: "At the last regular meeting of the local authorities, Messrs. C. C. English and H. W. Powers, who had been appointed a special Committee to investigate certain phases of the local gas supply, submitted a report. The Committee was appointed at the last meeting of the Board of Aldermen to inquire into the fact whether or not the charter of the Bristol Gas and Electric Company permitted it to increase selling rates. The Company had sent out notices that the minimum rate would be raised from 50 cents to $1 per month. This action on its part had met with a great deal of opposition on the part of the citizens, and it was brought to the attention of the Board at the last meeting. The Committee presented a long and detailed report on the matter. They contended that the Company had not the right under its franchise to fix a minimum rate irrespective of the amount of gas used, and that it could not collect for any gas that the meter did not register. They also recommended that their report be shown to the Company, and if it did not comply with the regulations that its franchise with the city would be declared null and void. The Company was given to the 1st of October to regulate the rates in compliance with the report of the Committee. The report *in extenso* was adopted by the Board."

MR. S. A. CARDER has resigned from the service of the Hemet-San Jacinto (Cal.) Gas Company. We understand that he has joined the staff of the Los Angeles Company.

"PEORIA folks had a grand time of it early this month, when the proprietors of the Peoria Gas and Electric Company bade the people welcome to the remodelled offices and beautifully fitted salesroom in the Jefferson avenue premises. Every lady who called received a souvenir (there were '57' sorts of especial souvenirs) of her visit, the list including all manner of labor saving gas and electric appliances, from a gas stove down to an electric flatiron heater, for which every lady deposited a numbered coupon which were drawn by the representatives of the three daily papers, who decided upon the winners of these special prizes. The room at 125 Jefferson avenue, which was formerly used for office purposes, has been transformed into a salesroom for gas and electric appliances which are necessary to a modern home. There were electrically operated washing machines and wringers which prepare the clothes for the electrically heated iron, and repairs may be made on the electric sewing macnine. Going farther even than the gas stove were electric cookers which perform all culinary operations after a fashion. There was also a gas water heater which instantaneously furnishes hot water for the wash bowl, tub and shower at the same time. The room was lighted by the new Tungsten electric lamp. The room at 127 Jefferson avenue is now used for the cashiers' and complaint departments and has ample accommodations to handle a very large crowd of customers. In the rear elaborate offices have been fitted up for the Directors, Superintendent and other officials, and the bookkeeping and accounting department."

MR. W. H. SCHEW, of St. Louis, is Superintendent of Construction for the gas plant that is being erected at Creston, Ia., by the Creston Gas and Electric Company.

THE proprietors of the Oberlin (O.) Gas and Electric Company have ordered an increase of $85,000 in its capital stock. The present capitalization is $115,000.

THE employees of the Boston Consolidated Gas Company, under the provisions of its existing profit sharing plan, now own over 10 per cent. of the preferred shares of the holding concern—the Massachusetts Gas Companies.

AT the special meeting of the shareholders of the Bay State Gas Company, of Delaware, held last Monday, this resolution was adopted: "That the President be and is hereby duly authorized in his discretion to sell and dispose of or otherwise make use of the 287,000 shares of stock in the treasury of the Company, and that the Directors be instructed to make any further issues of the fully authorized capital stock of this Company, should President Lawson at any time find it convenient or necessary for paying for any property or for any business purpose of the Company." Mr. Addicks never had any broader authorization than that.

MR. SAMUEL T. MURDOCK, of Lafayette, Ind., occupies one of the high places in the Directorate of the Indiana Consolidated Gas Company, which has succeeded to the natural gas estates of the one-time famous Dieterich syndicate.

PROF. VICTOR LENKER, of the Chair of Chemistry, and Prof. F. W. Huels, of the Department of Engineering, of the University of Wisconsin, who were empowered to test the gas supplied in Appleton, Wis., by the Wisconsin Traction, Light, Heat and Power Company, have reported that the service is satisfactory in every respect; in fact, well above the legal standard requirements.

THIS important piece of news was recently vouchsafed to a reporter the other day by John I. Beggs, President of the United Railways Company and of the Laclede Gas Light Company, of St. Louis, Mo.: "I expect to move to St. Louis and make it my permanent residence as soon as the home of my daughter, Mrs. Mary G. B. McCulloch, which is being built in Washington terrace, is finished." Well! Well!!

THE Collins family—W. W., Addie C., Z. I., and E. B.—have incorporated the Paw Paw Gas Company, which concern is to construct and operate a gas works in Paw Paw, Ills. The capital stock is put at $15,000, with power to increase it.

NEXT Monday the Common Council, of Madison, N. J., will meet to consider the application of the Morristown Gas Light Company for a franchise to distribute gas in Madison, for cooking, heating and power purposes only. The life of the grant is put at 50 years.

MR. J. T. HOLMES, one of those who served on the original Kansas City (Mo.) Gas Company, and who has been connected with its interests as a Director through all the changes in its proprietorship, died at his home, 2839 East Ninth street, Kansas City, the morning of the 11th inst. Born in Shelby county, Ky., October 24, 1837, he accompanied his parents to what is now Kansas City, in 1843. His father prospered there, and when able to take his own part in a business career the way was fairly smooth for him. His talent, however, was of the sort that sent him on, and by 1860 he was prominent in its trading, especially in the line of its banking interests. His death was undoubtedly traceable to the death of his wife, who passed away last April. He was a much respected citizen, and his personality was of the nature that endeared him heartily to all. He is survived by a daughter and two sons.

MR. F. H. KNOX has been elected Vice-President and General Manager of the Spartanburg (S. C.) Electric, Power and Manufacturing Company, which concern owns and operates the local railway, gas, electric light and power systems.

WE understand that the public utilities of Frederick, Md.—meaning the gas and electric lighting systems of that thriving settlement—have been or are about to be acquired by Mr. Henry L. Doherty and his associates.

MR. JAMES J. CREAMER, one of the meter inspectors on the force of the Richmond (Va.) City Gas Works, and prominently identified with the International Association of Machinists, sailed for Europe last week, where he goes as a delegate to attend the Congress of the British Trades' Union. He is accompanied by his daughter.

THE City Council of Snohomish has granted the petition of the promoters of the Snohomish Gas Company, for an extension of time in which to construct the works. Mr. P. E. Hall, of Everett, Wash., is the leading man in this proposition, which we fear does not look any too substantial.

A CORRESPONDENT in San Antonio, Tex., writing under date of the 18th inst., incloses the following: "At a meeting of the City Council, of Brownwood, Tex., a franchise was granted to the proprietors of the Ingram Company under their agreement to furnish the residents with either natural or artificial gas. Should not sufficient natural gas be found to supply the wants of the city, the Company has a right to manufacture its own gas. The franchise is for a period of 30 years, and the rates fixed by the Council are $1, and $1.50 as the maximum. The Company promoters say they will have its first well started by the 1st of September, and that a number of wells will be put down as fast as possible—a twofold object being in view, gas and oil."

THE prior mention respecting the promotion of Mr. R. C. Jones to the Assistant Secretaryship of the San Antonio Gas, Electric and Traction Company, may be here completed by noting that the Directors subsequently named Mr. Jones to the Secretaryship. Mr. P. L. King succeeds Mr. Jones as Auditor.

THE Massachusetts Board of Gas and Electric Light Commissioners has dismissed the petition of the Chester Board of Selectmen, who asked that the Commission order a decided cut in rates by the Chester Electric Light Company.

The Market for Gas Securities.

The oscillations and queer shuttlecock motions of the general market were effective in keeping Consolidated on the move during the week, with the general result that quotations are quite on the low side. Consolidated at noon to-day (Friday) was 135 to 136. This, of course, is ex-dividend.

Bay State is still the reigning sensation on the curb, it having gone something above 3½ yesterday. It may go higher, but eventually it will be lower. Peoples, of Chicago, is steady, and Washington, D. C., hold well its gain.

Gas Stocks.

Quotations by George W. Closr, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

AUGUST 24.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated Gas Co.	$78,177,000	100	135	136
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	93	93½
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	130	140
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	92	96
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98	104
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	90	98
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1990, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	126	132
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	299,600	500	130	—
Out-of Town Companies.				
Bay State	50,000,000	50	2½	2¾
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,000,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	105¼
Cincinnati Gas and Electric Co.	20,500,000	100	90	90½
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. & Heating Co.	1,632,750	100	87	88
Preferred	3,026,500	100	71	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,000,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	—	—	74½	75
Detroit City Gas Co	6,000,000	50	—	50
Prior Lien 5's	4,618,000	1,000	—	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" no. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	100	105
" Bonds, 5's	10,500,000	—	101	102½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,050,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	200,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	96
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	—	100
Preferred	2,500,000	100	60	90
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	55	55¼
Preferred	25,000,000	100	86½	87
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	95¼	95½
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	620,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,485,000	1,000	90¾	—
Syracuse Gas Co., N. Y	1,975,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington (D. C.) Gas Co.	2,600,000	20	332½	335
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	230	—

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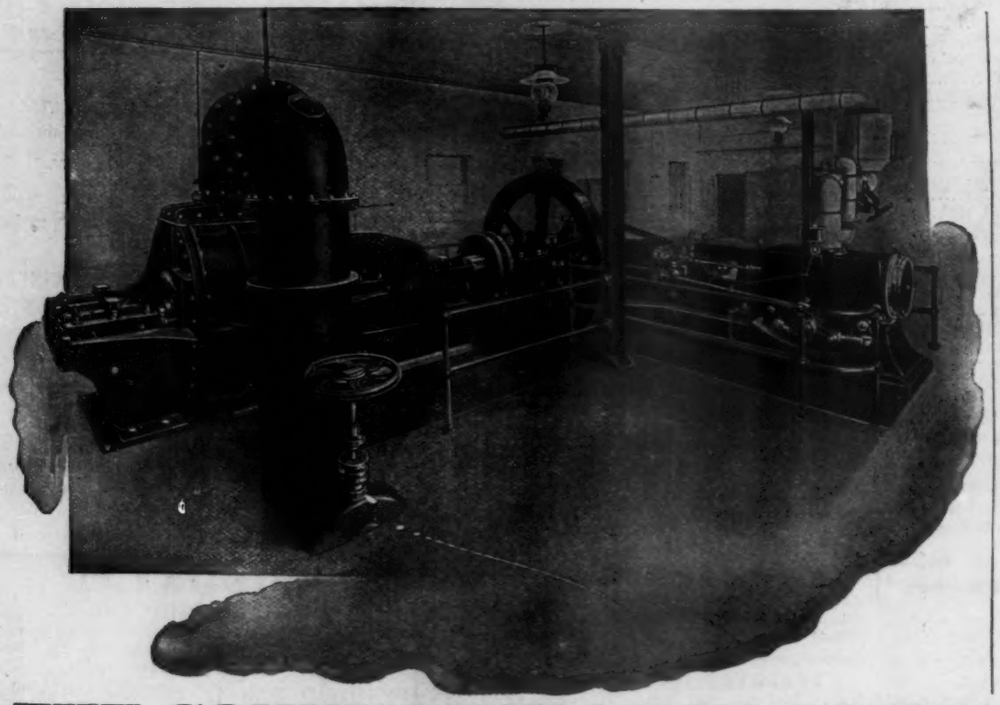

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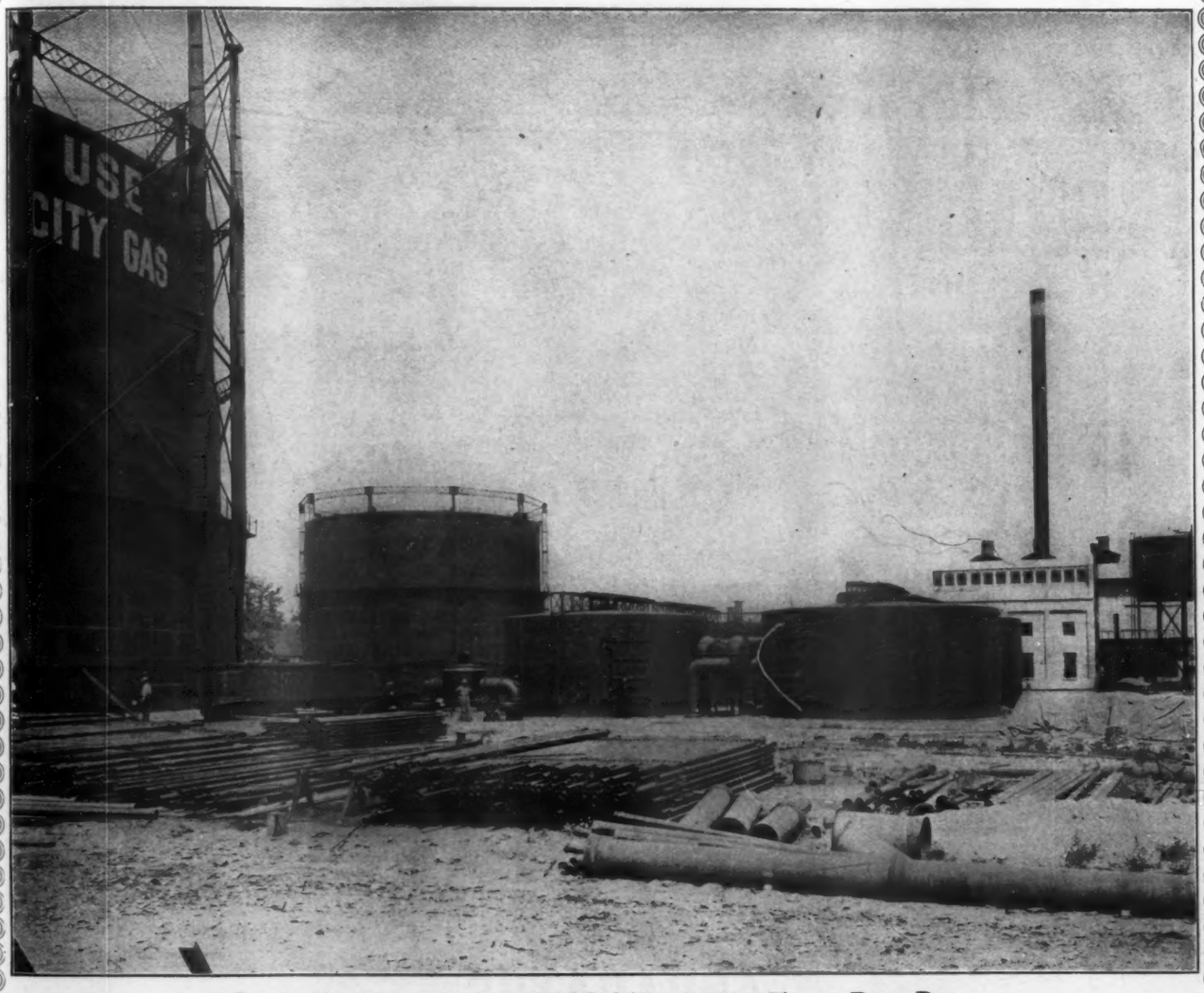

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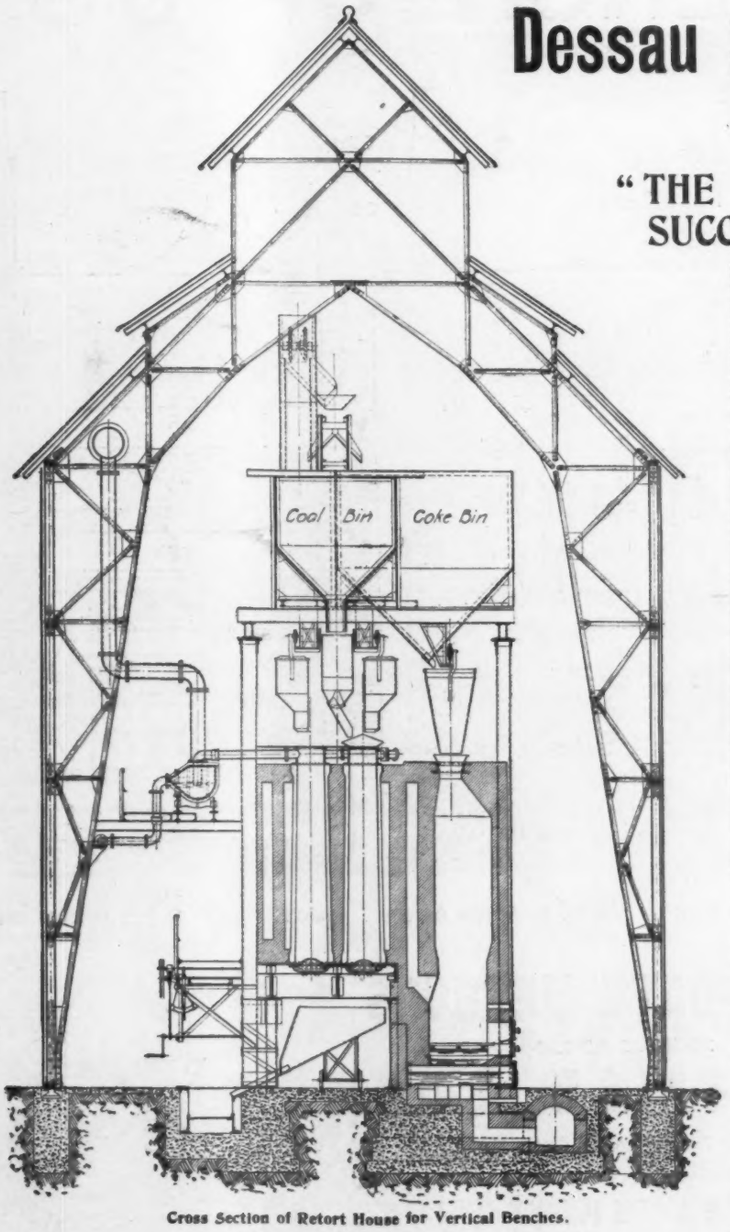

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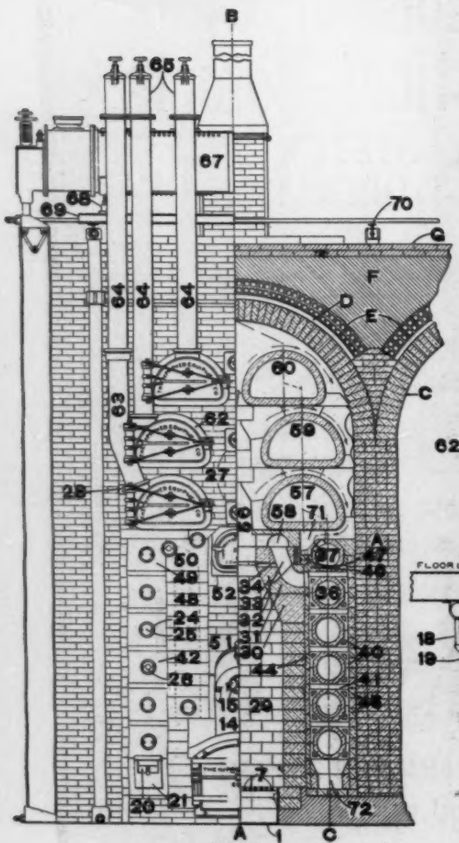

FIG. 1.
HALF SECTIONAL FRONT ELEVATION

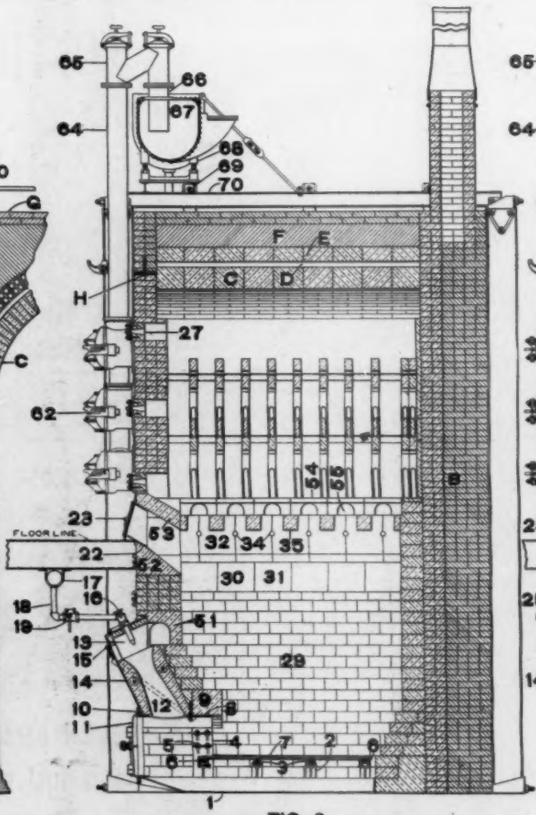

FIG. 2.
SECTIONAL SIDE ELEVATION ON A-B

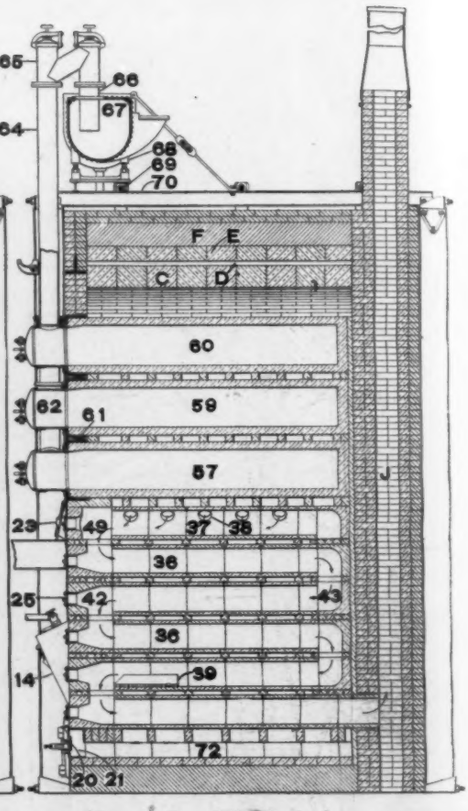

FIG. 3.
SECTIONAL SIDE ELEVATION ON C-B

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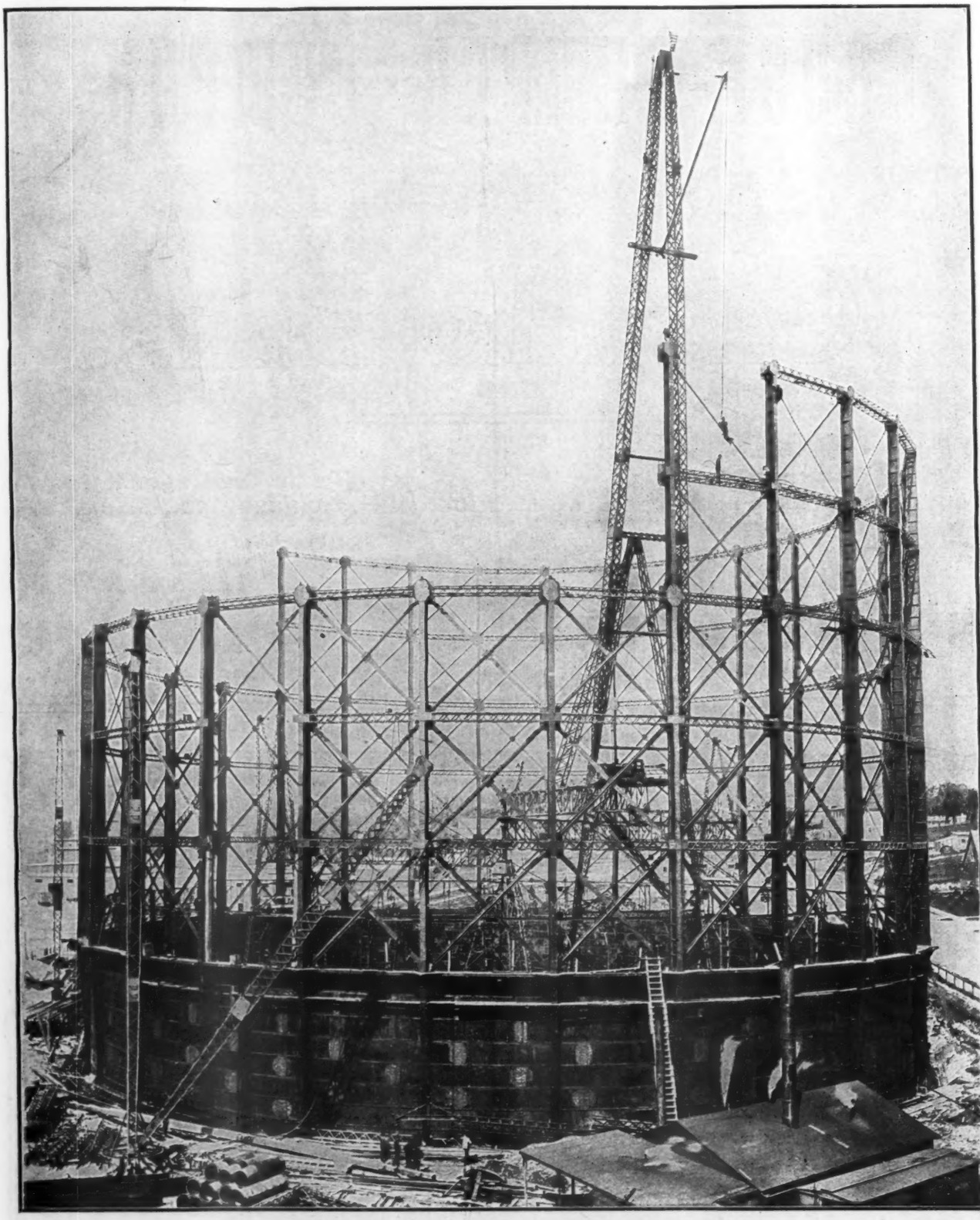

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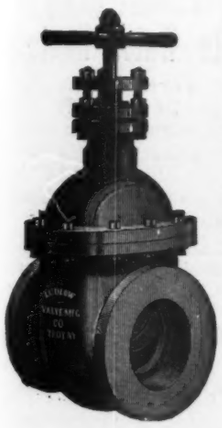

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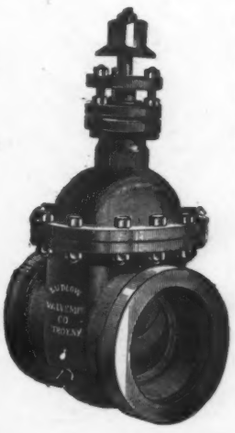

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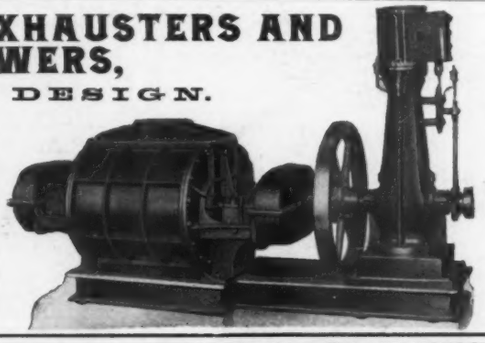

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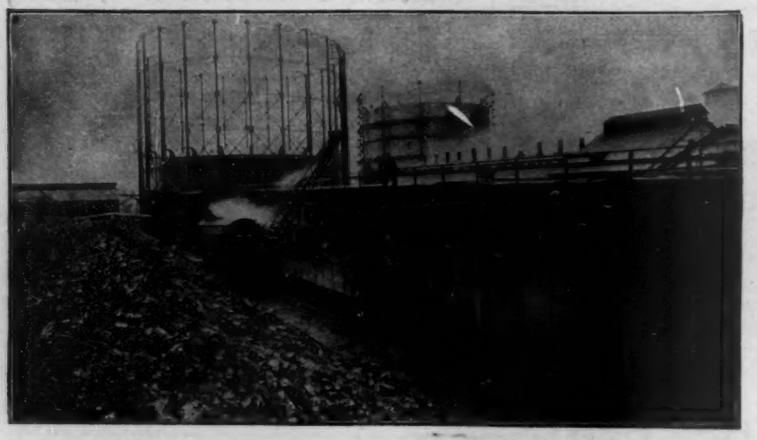

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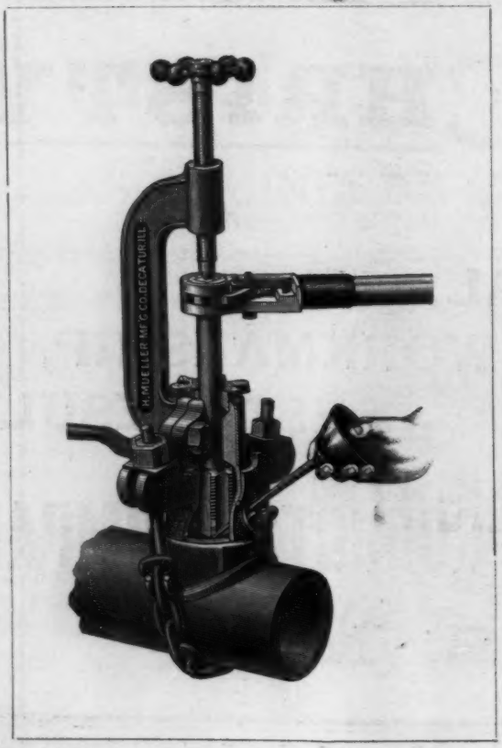

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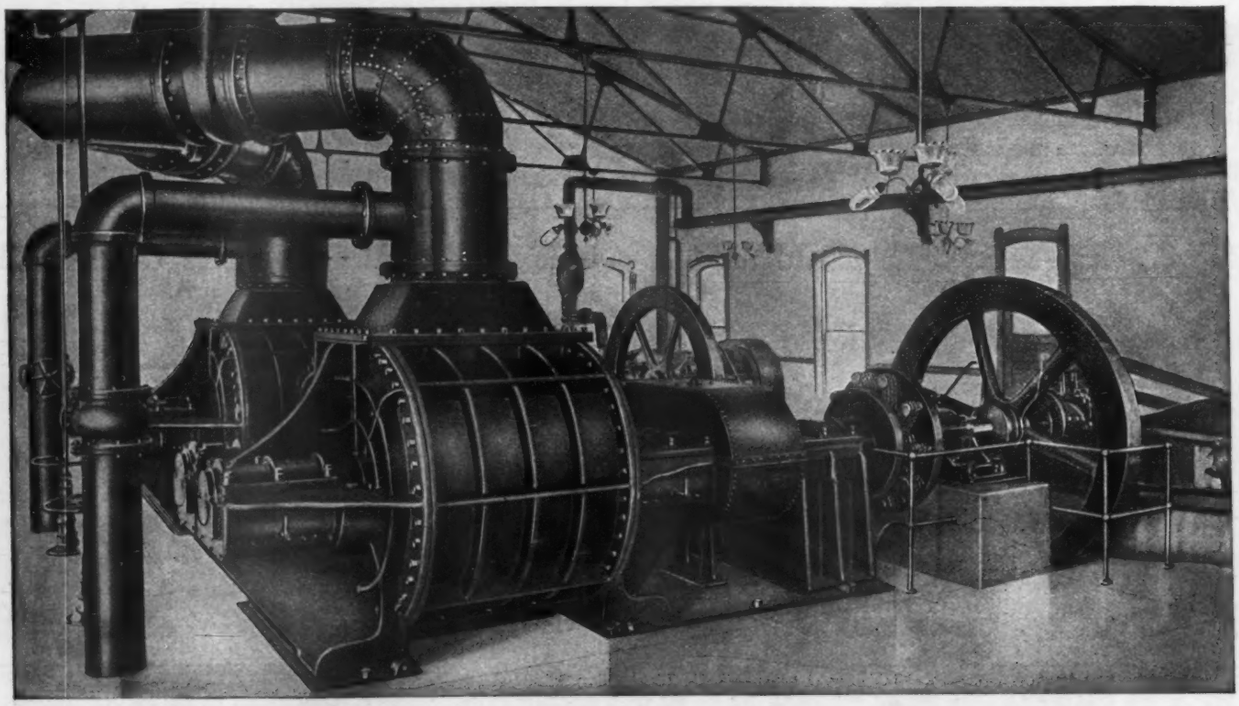

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PUBLIC LIGHTING TABLE.

SEPTEMBER, 1908.

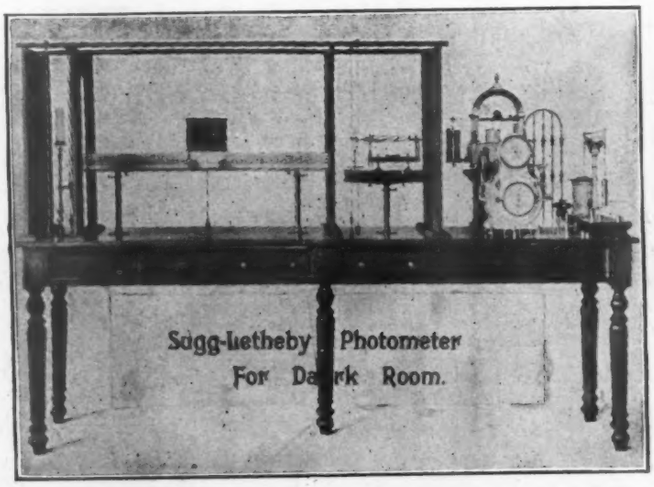
Table No. 1.
FOLLOWING THE MOON.

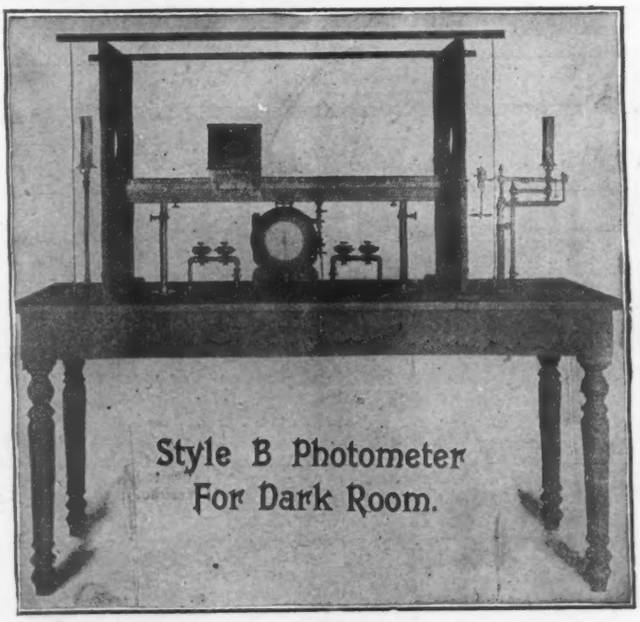
Day of Week.	Date.	Light.	Extinguish.
Tue.	1	8.30 PM	4.30 AM
Wed.	2	9.10	4.30
Thu.	3	9.50 FQ	4.30
Fri	4	10.30	4.30
Sat.	5	11.30	4.30
Sun.	6	12.40 AM	4.30
Mon.	7	1.50	4.30
Tue.	8	3.10	4.30
Wed.	9	No L.	No L.
Thu.	10	No L. FM	No L.
Fri.	11	No L.	No L.
Sat.	12	6.50 PM	8.50 PM
Sun.	13	6.40	9.30
Mon.	14	6.40	10.00
Tue.	15	6.40	10.30
Wed.	16	6.40 LQ	11.10
Thu.	17	6.40	12.00
Fri.	18	6.40	12.50 AM
Sat.	19	6.40	1.40
Sun.	20	6.30	2.40
Mon.	21	6.30	3.40
Tue.	22	6 30	4.50
Wed.	23	6.30	4.50
Thu.	24	6.30	4.50
Fri.	25	6.30 NM	4.50
Sat.	26	6.30	4.50
Sun.	27	6.20	4.50
Mon.	28	6.20	4.50
Tue.	29	6.20	4.50
Wed.	30	7.50	4.50

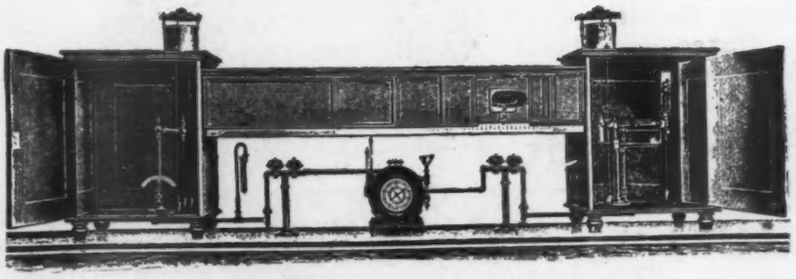
TOTAL HOURS DURING 1908.

By Table No. 1.

	Hrs.Min.
January	228.30
February	187.30
March	192.00
April	160.10
May	155.10
June	138.00
July	155.50
August	173.40
September	185.20
October	214.00
November	218.10
December	226.40
Total, yr.	2235.00







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PUBLIC LIGHTING TABLE.

SEPTEMBER, 1908.

Table No. 2.
NEW YORK CITY.
ALL NIGHT LIGHTING.

Day of Week.	Date.	Complete Lighting in One Hour From Time Given P. M.	Complete Extinguishing in 50 Minutes From Time Given A. M.
Tue.	1	6.27	3.57
Wed.	2	6.27	3.57
Thu.	3	6.17	4.07
Fri.	4	6.17	4.07
Sat.	5	6.17	4.07
Sun.	6	6.17	4.07
Mon.	7	6.12	4.07
Tue.	8	6.12	4.07
Wed.	9	6.12	4.07
Thu.	10	6.02	4.17
Fri.	11	6.02	4.17
Sat.	12	6.02	4.17
Sun.	13	6.02	4.17
Mon.	14	6.02	4.17
Tue.	15	6.02	4.17
Wed.	16	6.02	4.17
Thu.	17	5.52	4.27
Fri.	18	5.52	4.27
Sat.	19	5 52	4.27
Sun.	20	5.52	4.27
Mon.	21	5.47	4.27
Tue.	22	5.47	4.27
Wed.	23	5.47	4.27
Thu.	24	5.37	4.37
Fri.	25	5.37	4.37
Sat.	26	5.37	4.37
Sun.	27	5.37	4 37
Mon.	28	5.32	4.37
Tue.	29	5.32	4.37
Wed.	30	5.32	4.37

TOTAL HOURS DURING 1908.

	Hrs.Min.
January	481.50
February	329.15
March	351.50
April	341.50
May	233.05
June	218.10
July	282.55
August	254.55
September	292.25
October	420.45
November	374.30
December	411.05
	3992.35
Deduct on account of 50 min. extinguishing time	30.30
Total, yr.	3962.05

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 512 Oak Street.

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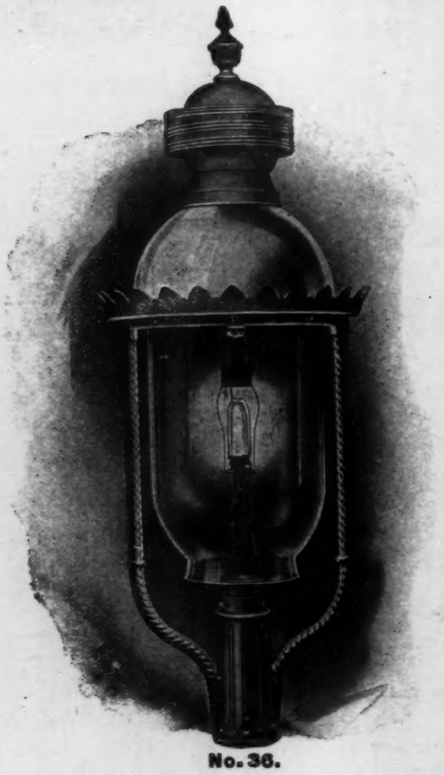
....OF AMERICA....



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POINTS OF MERIT:

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IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

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Package Contains 16 Dozen.

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Augusta, Me. (2d contract).
Everett, Mass.
Jenkintown, Pa. (2d contract).
Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (2d contract).
Holyoke, Mass.
Peoria, Ills.
Schenectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.
New Hartford, Conn.
Poughkeepsie, N.Y. (2d contract).
Nashville, Tenn.
Salisbury, Md.
Norfolk, Va. (4th contract).
Wallingford, Conn.
Richmond, Va. (2d contract).
Oak Bluffs, Mass.
Arlington, Mass.

TOTAL SETS INSTALLED DURING YEAR, ... 43
TOTAL SETS INSTALLED TO DECEMBER 31, 1907, ... 677
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1907, ... 545,865,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
Photometrical Apparatus.
Gas Analysis Apparatus.
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Straight Standpipe System for Coal Gas Retorts.
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Waste Heat Boiler.
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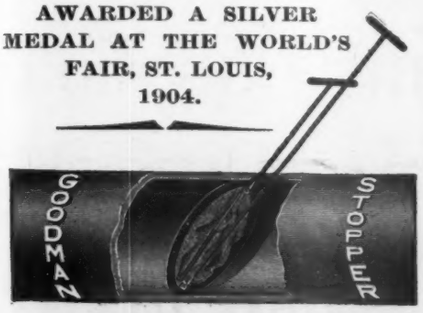

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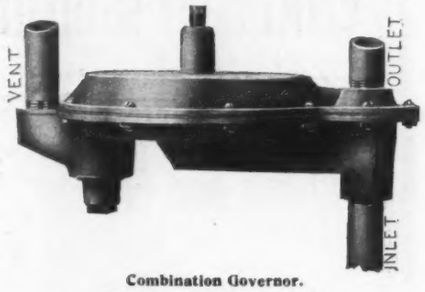

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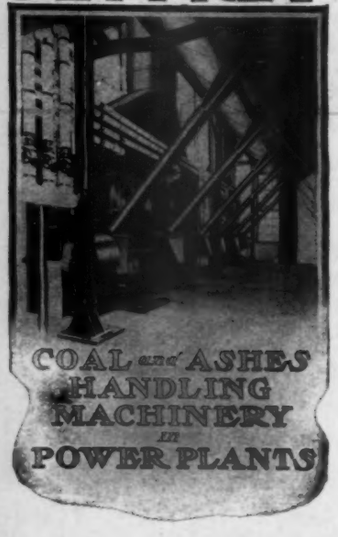

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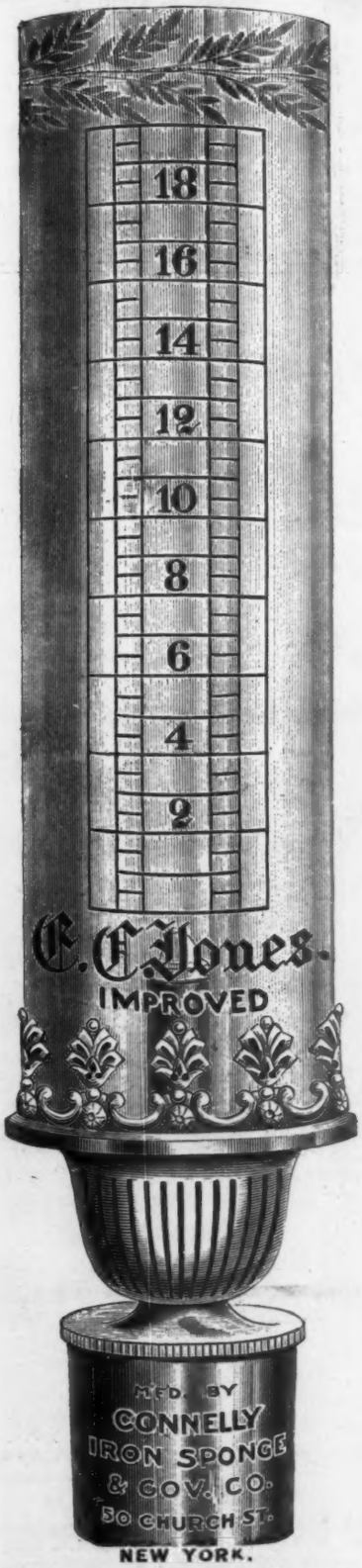

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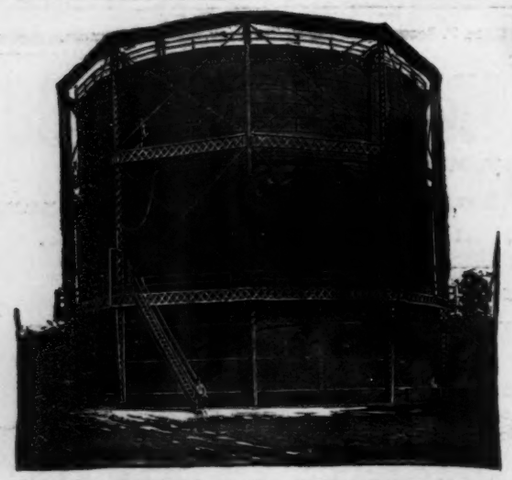

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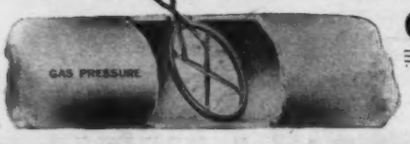

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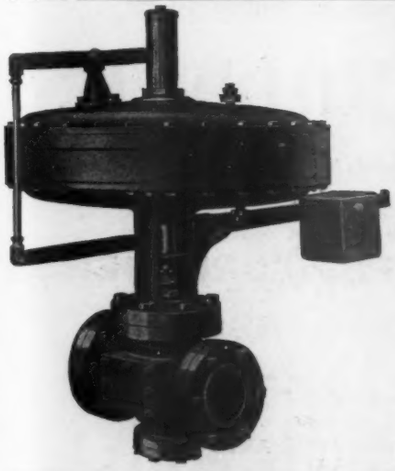

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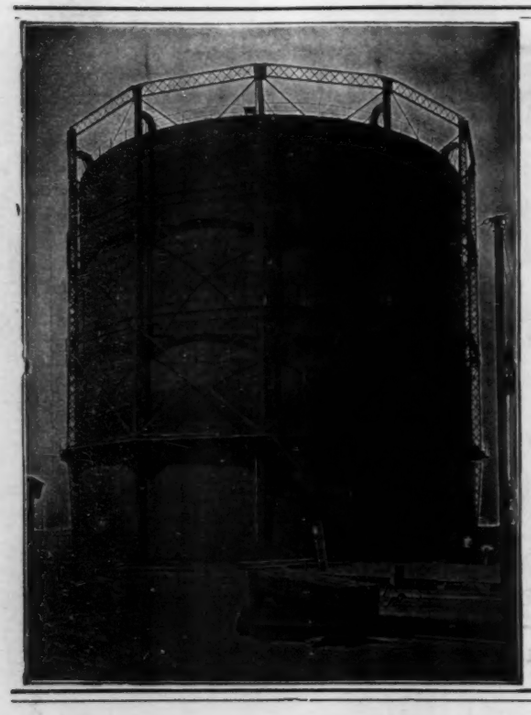

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